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ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

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MAY and JUNE.

[1891.

CXCIX.—BOTANICAL ENTERPRISE IN THE WEST INDIES, 1890-91.

The scope of botanical effort in the West Indies has of late years been considerably expanded. This has been due to a desire on the part of the smaller islands to possess botanical institutions that would be capable of becoming centres for the growth and distribution of economic plants, and thus assist in the general development of local industries. The larger establishments at Jamaica, Trinidad, and British Guiana have already proved of great value in this direction. To meet the wishes of the smaller islands a scheme of Botanical Stations has been devised as described in the *Kew Bulletin* (June and July 1887). In the organisation of this scheme successive Secretaries of State for the Colonies have taken a warm interest, while in the elaboration of the details Kew has taken an active part.

Since 1884 Botanical Stations have been established in the Windward Islands at Grenada, St. Vincent, and St. Lucia; in the Leeward Islands at Antigua, Montserrat, Dominica, and St. Kitts-Nevis; while

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a very important one has been in active work for some time at Barbados. The Curators at these Stations are, for the most part, men carefully trained at Kew, and their chief qualification is a thorough knowledge of horticultural methods as applied to tropical plants. The main object in view is to meet the special circumstances of the West Indies at the present time, and do all that is possible to encourage a diversified system of cultural industries, and thus relieve them from the results inevitable from the fluctuations of prices in the one or two staples to which they have hitherto confined their attention. The Botanical Station scheme affords indirectly the basis of a federation for purely economic purposes likely to be beneficial to all classes of the community.

As the scheme took root the discussion of details involved a heavy burden of correspondence on Kew, and unexpected administrative difficulties arose which required careful and judicious treatment. The task seemed almost hopeless of solving the difficulties successfully by correspondence alone. It therefore seemed advisable to send out to the West Indies a member of the Kew Staff, who by previous experience was well acquainted with the different Colonies, and who by oral discussion would be able to remove many of the obstacles in the way of the progress of the scheme. The task was entrusted to Mr. D. Morris, F.L.S., the Assistant Director, who before his transfer to Kew had been for many years in charge of the Botanical Department at Jamaica. The following correspondence records the circumstances under which the Imperial Government assented to Mr. Morris's mission. He left England in November last, and returned to Kew at the end of February. His detailed report on the present position of the Botanical Stations is, by permission of the Secretary of State, reproduced in the present numbers of the *Kew Bulletin*.

ROYAL GARDENS, KEW, to COLONIAL OFFICE.

SIR,

Royal Gardens, Kew, 21 March 1890.

I HAVE the honour to acknowledge the receipt of your letter of March 15, in which you inform me of the general concurrence of the Secretary of State in the views which I have ventured to express as to the measures which it appears to me desirable to take for the development of the resources of the West India Islands, by what may be conveniently described as "botanical enterprise."

A good deal, as you are aware, has been already accomplished in the way of the needful organisation. But though no pains have been spared by this establishment to get matters into a right groove by means of unofficial correspondence, I cannot say that I am altogether satisfied with the position in which they at present stand. I am driven, therefore, to the conclusion that the new system will only obtain the start which is necessary for its subsequent progress on a permanent basis, if it receives, in its present stage, the assistance and supervision of an officer thoroughly conversant with the technical details of an administrative problem of this description, and well acquainted with the successive steps which, during the past eight years, have been taken in its development.

It is for these reasons that I have suggested that the Assistant Director should go out to the West Indies next winter. I must confess that I am reluctant to deprive myself of the services of the principal

member of my staff; but I feel that the situation is of sufficient importance to demand some sacrifice on my part.

On the other hand, Mr. Morris, while equally impressed with the importance, and, indeed, necessity of the mission, and willing to undertake it, is in no degree anxious to do so. While he is ready to go as part of his official duties, and therefore does not suggest that any honorarium additional to his pay should be given him for his services, he very properly stipulates that his mission shall not in any way be held to affect his salary, service, or other circumstances of his position as a member of the staff of this establishment.

A mission of this kind must be regarded as an affair of State. It must, therefore, be distinctly understood that the only official action I can take beyond advising it, is to give it my formal sanction. The necessary assent of Her Majesty's Government must be obtained by the Secretary of State, and it must filter down to me through the regular official channels.

I am, &c.

(Signed) W. T. THISELTON DYER.

Edward Wingfield, Esq., C.B.

COLONIAL OFFICE to ROYAL GARDENS, KEW.

SIR,

Downing Street, 26th April 1890.

I AM directed by Lord Knutsford to acquaint you that, with the concurrence of the Lords Commissioners of the Treasury, His Lordship desires to avail himself of the services of Mr. Morris in visiting, in the course of this year, the following West Indian Islands: Grenada, St. Vincent, St. Lucia, Antigua, St. Kitts, Dominica, in which Botanical Stations have been or are intended to be established, for the purpose of assisting the Colonial Governments in placing these institutions on a sound and durable basis.

Lord Knutsford understands from previous correspondence, that Mr. Morris is willing to undertake such a mission without any honorarium in addition to his salary, his expenses, of course, being defrayed by the Colonies in question, and that you are willing that he should do so.

I am to request to be informed at what time it would be convenient for Mr. Morris to visit the islands.

I am, &c.

The Director, (Signed) ROBERT G. W. HERBERT.
Royal Gardens, Kew.

ROYAL GARDENS, KEW, to COLONIAL OFFICE.

SIR,

Royal Gardens, Kew, 2 June 1890.

I HAVE the honour to acknowledge the receipt of your letter of April 26, in which you request to be informed at what time it is proposed that Mr. Morris should leave England in order to visit the West Indian Islands in which Botanical Stations have been or are intended to be established.

In reply I have to inform you that the middle or beginning of November would be the most convenient date to fix.

It has always been part of the scheme that the stations should be in some kind of relation to the larger and central Botanical Departments of Trinidad and Jamaica. It will therefore be essential that Mr. Morris should also visit both those islands in order to settle the practical details of such an arrangement by conference with the respective heads of the two Botanical Departments. I am in hopes that by this last means Mr. Morris will see his way to soive finally the innumerable petty administrative difficulties which have hitherto hindered the effective working of the scheme and have given rise to so much correspondence.

I am, &c.

(Signed) W. T. THISELTON DYER.

Sir Robert G. W. Herbert, K.C.B.

ROYAL GARDENS, KEW, to COLONIAL OFFICE.

Royal Gardens, Kew, 22nd September 1890.

I HAVE the honour to acknowledge the receipt of your letters of the 2nd and 14th ultimo, informing me that the Governments of the Windward and Leeward Islands will gladly avail themselves of Mr. Morris's services in his mission to the West Indies with the view to the development of the scheme for the establishment of Botanical Stations.

2. I am now in a position to inform you that Mr. Morris will embark by the Royal Mail Steamer leaving Southampton on the 12th November next, and in accordance with an intimation already privately conveyed to Sir W. F. Haynes Smith he will proceed direct to Antigua, where he hopes to arrive on the 27th November.

3. After consultation with the Governor-in-Chief he will visit severally the islands of the Leeward group, in which Botanical Stations have been or are intended to be established.

4. Mr. Morris will then arrange to proceed to the Windward Islands, and he will be prepared to meet Sir Walter Hely-Hutchinson at any island where he may at the time be engaged. Afterwards Mr. Morris will visit Trinidad and Jamaica to discuss and arrange any details that may be deemed necessary for the supervision of the stations from these centres, as suggested in the third paragraph of my letter of the 2nd June last.

* * * * *

6. The Secretary of State will be interested to learn that Mr. Morris will take out with him from Kew, for the botanical establishments in the West Indies, several Wardian cases of Gambier plants (*Uncaria Gambier*) which have been raised for the purpose at this establishment.

7. Gambier is an article largely used for tanning purposes. It used to cost 10*l.* per ton, and now costs 40*l.* Hitherto it has been exclusively produced in the Straits Settlements, but the present state of the trade appears to justify its extended culture in other parts of the tropics. An effort is now being made, in accordance with the usual policy of Kew in regard to new cultures, to introduce the Gambier to the West Indies, where hitherto it has not been known.

8. The plants which Mr. Morris will take out with him will, it is hoped, enable the botanical establishments in this part of the world to raise within a reasonable time a stock sufficiently large to distribute to such planters as may feel disposed to try it on a commercial scale.

A somewhat full account of Gambier is given in the *Kew Bulletin* for 1887, pp. 247-253, a copy of which is enclosed.

9. You will easily understand that the delegation of a member of the staff of an administrative establishment such as Kew upon a mission of this kind is a procedure of an extremely exceptional nature. It has only been justified by a sense of the extreme importance at the present moment of starting the West Indies in a direction which there is good ground for believing will lead to their ultimate prosperity. This the West Indies are beginning themselves to understand. There are already indications that there will be every desire to use Mr. Morris's assistance to the utmost. There will be every inducement, in all probability, brought to bear upon him to prolong his stay, so as to give his technical assistance in many matters outside the immediate scope of his mission.

I feel it, however, my duty to point out that I have obtained the assent of my Board for his absence during a period specially limited to three months, and I do not think that it would be compatible with the due performance of the multifarious and absorbing duties which fall on this establishment to entertain any proposal for a prolongation of this period.

I have, &c.

(Signed) W. T. THISELTON DYER.

Edward Wingfield, Esq., C.B.,
Colonial Office, S.W.

The following letters, communicated to this establishment by the Colonial Office, express the satisfaction of the Governments of the Leeward and Windward Islands respectively at the manner in which Mr. Morris carried out his mission.

THE GOVERNOR OF THE LEEWARD ISLANDS TO THE COLONIAL OFFICE.

Government House, Antigua,
December 27, 1890.

MY LORD,

I HAVE the honour to report that Mr. D. Morris, the Assistant Director of the Royal Gardens at Kew, arrived in the Colony, and in company with myself has visited each of the different islands.

Much interest has been exhibited in the objects of Mr. Morris's visit, and an impetus has been given, by his energy and ability, to the development of cultural industries, for which I desire to express to your Lordship my warm acknowledgments.

Mr. Morris has now seen for himself, and, I believe is convinced, that there is a much larger field for enterprise in the Leeward group than is generally supposed. I have already, in this connexion, expressed to your Lordship my own opinion, that these islands may become whatever your Lordship chooses, and the present appears to be a favourable opportunity for taking active measures.

* * * *

Public meetings were held in Antigua, St. Kitts, Dominica, and Montserrat, which were well attended, and at all of which much interest was shown, with the evident desire of obtaining instruction.

The Gambier plants have thriven in Dominica with great success, and I propose to open a Government plantation for the cultivation of Gambier, for, if attention in England can be directed to the very exceptional advantages offered in Dominica for the cultivation of various

economic tropical plants, the Crown lands there would be readily taken by persons with capital.

The visit of Mr. Morris has been very well received by all classes, and it has been taken as a pleasant gift from the Home authorities.

If your Lordship sees no objection, I would ask that the thanks of the Colonial Government might be communicated to the authorities at Kew, for permitting Mr. Morris to visit these islands, and to Mr. Morris personally, for the valuable services he has rendered to the Colony during his visit, services which I trust he may add to by continuing to give us his aid whenever it may be possible for him to do so.

I have, &c.

(Signed) W. F. HAYNES SMITH.

The Right Hon.

Lord Knutsford, G.C.M.G., &c.

The GOVERNOR-IN-CHIEF OF THE WINDWARD ISLANDS to the
COLONIAL OFFICE.

MY LORD,

St. Vincent, January 19, 1891.

WITH reference to your Lordship's despatch, Grenada, No. 79, of 30th September, I forward reports by Mr. D. Morris on the Botanic Gardens of St. Lucia, St. Vincent, and Grenada.

I am in communication with the Administrators of St. Vincent and St. Lucia, and shall do my best to give effect to Mr. Morris's suggestions.

* * * * *

Mr. Morris arrived in Grenada on the 1st instant, and left on the 16th instant. I regret to say that for three days he was unable to leave the house, having injured his foot by an accident at St. Vincent. This delayed his work in Grenada, and rendered it impossible for him to complete it in time to enable him to visit Trinidad.

Mr. Morris visited some of the principal estates in Grenada, and delivered an interesting and instructive address in St. George's. He devoted several days to a thorough examination of the Botanic Garden, and spent two days in a botanical exploration of the ridges above the Grand Etang.

* * * * *

I beg reference to the Administrator's despatches, forwarding an account of Mr. Morris's proceedings at St. Lucia and St. Vincent.

Mr. Morris has been at great pains to inform himself as to the agricultural requirements of the islands. He has devoted himself with remarkable zeal and energy to the objects of his mission, has shown a deep interest in the progress of these communities, and has made many valuable suggestions to those interested in horticulture and agriculture. The advice which he has given, and the suggestions he has made, should not fail, if followed out, to conduce to valuable results. I give expression to a widely felt sentiment when I say that these Colonies are deeply indebted to Mr. Morris for his exertions, and to Her Majesty's Government for allowing him to visit the Windward Islands.

I have, &c.

(Signed) WALTER HELY-HUTCHINSON.

The Right Hon.

Lord Knutsford, G.C.M.G., &c.

REPORT of a BOTANICAL MISSION to the West Indies, undertaken by the Assistant-Director, Royal Gardens, Kew, presented to the Secretary of State for the Colonies, April 20, 1891.

IN accordance with the arrangements made at the request of the Secretary of State for the Colonies, and with the consent of the Lords Commissioners of Her Majesty's Treasury, and of the First Commissioner of Her Majesty's Works and Public Buildings, I left Kew for the West Indies on the 12th November 1890. I embarked at Southampton in the Royal Mail steamship "Atrato." I took out with me from the Royal Gardens, Kew, six Wardian cases of Gambier plants and four boxes of vine cuttings. These were destined for the following botanical institutions in the West Indies: A Wardian case of Gambier plants each for the Botanical Gardens at Trinidad and British Guiana; a Wardian case of Gambier plants and a box of vine cuttings for the Botanical Station at St. Vincent; a box of vine cuttings for the Botanical Station at St. Lucia; a Wardian case of Gambier plants and a box of vine cuttings for the Botanical Station at Dominica; and a box of vine cuttings for the Botanical Garden at Grenada. The Gambier plants had been raised at Kew from seed received from the Botanical Department of the Straits Settlements. They had always proved most difficult to send in Wardian cases, and several attempts to obtain plants from the East had hitherto failed. A full account of Gambier, a tanning substance obtained from *Uncaria Gambier*, Roxb., is given in the *Kew Bulletin*, October 1889, p. 247.

The present attempt to introduce the cultivation of Gambier into the West Indies is a fact of some interest. It was only possible to arrive thus far in the matter after several years of persistent effort. The Gambier industry had hitherto been entirely confined to the East Indies, but owing to the increased demand due to American consumption and the deterioration in quality which had obtained of late years it was felt desirable to extend its culture to other parts of the tropics. The effort made to place these plants at the disposal of those who may be inclined to cultivate them in the West India Islands is only a part of the policy pursued at Kew for many years. The plants in the first instance were entrusted to the botanical establishments in the West Indies to be propagated and distributed.

Owing to the cold weather the cases on board the "Atrato" were placed below in the main saloon. There was very little direct light in the day-time, but the question of warmth was for the moment of more importance than that of light. It was also hoped that they could be placed on deck in a day or two at the most. The weather during the whole of the first week, however, continued very cold, and it was impossible to expose the plants on deck. Under these circumstances it was fortunate that the electric light, with which every part of the ship was supplied, was available to try an experiment of some interest. Although the plants received very little light during the day, they had a good supply of the electric light during the night, and the plants in the cases more fully exposed to the electric light were afterwards found to be in a much better condition than the others. It is well known that plants will thrive under the influence of artificial light, but in this instance there was so little direct light available during the day that the plants had to depend almost entirely on the light they received at night. The Gambier plants are particularly sensitive as regards a diminution of light. During the prevalence of fogs at Kew they have been known

to drop their leaves within a day or two, and to remain bare during the rest of the winter. This may have been in some measure also due to the injurious influence of the fog itself.

In the present instance the plants were placed below on the 12th November, and were removed on deck on the 19th November. They had been below exactly one week. On deck they were placed on a hatchway on the starboard side, and shaded from the direct rays of the sun by an awning.

In order to make myself acquainted with the exact condition of the plants before they left my charge, the cases were opened on the 22nd November, about 36 hours before arriving at Barbados. All the plants were in good order; a few, it is true, had lost their leaves, but the greater number were in excellent condition. The case in which the plants had suffered most was one of the two intended for the Jamaica Gardens. This had been placed with its end towards the electric light, and, in consequence, had received less direct light than the others.

The use of electric light for the safe transit of such valuable plants as are obliged to be despatched from this country during the winter months is evidently capable of being greatly extended. It may also be utilised in the case of tropical plants arriving in this country from abroad, during the prevalence of cold weather. Such plants could be placed below directly the weather is becoming too cold for them on deck, and then the more electric light they have the better.

The "Atrato" arrived at Barbados on the morning of the 24th November. The cases for St. Vincent and Trinidad were transhipped on board the "Eden"; the case for Demerara was transhipped to the "Esk"; the case for Dominica was transhipped to the "Solent"; while the cases for Jamaica remained on the "Atrato," to go on direct to Kingston. The cases that were transhipped were carefully handled under the supervision of Mr. Owen, the chief officer of the "Atrato," and my personal thanks are due to Captain Brander and to this officer for the great interest they took in this valuable consignment of plants, and for the facilities afforded for their careful treatment during the voyage.

The reports received respecting the Gambier plants on arriving at their destination were as follows:—*Jamaica, Dec. 1st*, "34 plants in good order, 8 in fair order, 38 somewhat weak"; *British Guiana, Dec. 3rd*, "the plants arrived safely, all living"; *Trinidad, Dec. 17th*, "all the plants arrived safely, the larger portion growing freely"; *St. Vincent, Dec. 19th*, "15 plants in good order, 7 leafless, 10 dead"—these plants were overcarried by the "Esk" to Trinidad and La Guayra, and returned to St. Vincent 10 days late; *Dominica, Nov. 28th*, "the plants arrived in good condition."

As it had been arranged that I should first proceed to the Leeward Islands, I left Barbados on the evening of the 24th November, in the "Solent." The next morning we touched at Castries, the chief port of St. Lucia, and I had an opportunity of going ashore for about two hours, and visiting the Botanical Station with Mr. John Gray, the Curator. The steamer left Castries about 9 o'clock. The voyage from St. Lucia to Dominica was rendered particularly interesting on account of the clearness of the atmosphere and the beautiful view obtained of the chain of islands. Probably in no part of the world would it be possible to see a more charming picture of tropical scenery. After calling at St. Pierre, in Martinique, we arrived off Roseau, in Dominica, about 5 o'clock in the afternoon. The President of Dominica, Mr. G. R. Le Hunte, and Dr. H. A. A. Nicholls came on board to meet me. I was gratified to

learn that Mr. Green, the curator lately appointed to the Dominica Botanical Station, had made an excellent impression. Mr. Le Hunte brought with him a choice collection of cut flowers from his garden and some excellent fruit, as evidence of what could be grown in the climate and soil of Dominica. The case of Gambier plants and the box of vine cuttings were safely landed for the Dominica Botanical Station. The steamer touched at Basseterre, Guadeloupe, at midnight, and at Plymouth, Montserrat, in the very early morning. Soon after clearing Montserrat we had Redonda, a rocky islet, immediately to the north-west, and the peaks of Nevis and St. Kitts in the clouds beyond. To the north-east, about 25 miles away, was Antigua, with its low conical hills in the neighbourhood of Five Islands. We arrived outside the harbour of St. John, Antigua, about 10.30 on the morning of the 26th November. I was met by Mr. Lucie Smith, the Governor's private secretary, and reached Government House soon after 11 o'clock. I was kindly received by his Excellency Sir William F. Haynes Smith, K.C.M.G., and we proceeded at once to discuss the best means for carrying out the objects of my visit.

LEEWARD ISLANDS.

ANTIGUA.

Antigua is the seat of the Federal Government of the Leeward Islands, where the Governor and principal officers of the Colony reside. The Presidency of Antigua includes the islands of Barbuda and Redonda, with a total area of 170 square miles. Antigua is comparatively flat, the chief hills, reaching 1,200 to 2,000 feet, occupying the south-western portion. The climate is considered very healthy. It is generally dry, and sometimes suffers from severe droughts. The soil, composed of stiff clays and calcareous marls, is very retentive of moisture, and produces large crops. The chief productions are sugar, molasses, and rum. Some pine-apples and fruits are grown for export, and the negroes plant yams, sweet potatoes, guinea corn, and bananas. About one-third only of the island is under cultivation at the present time. The chief town is St. John, situated on a gentle slope overlooking a harbour of the same name. The population of St. John is about 10,000; of the whole island about 35,000.

November 26.—My first visit in Antigua was paid to the land selected as a site for the Botanical Station on Clare Hall Estate. Although operations had only been commenced during the past 12 months, considerable progress had already been made in laying out the land, and in starting nursery beds and experimental plots. The latter were devoted to 20 varieties of grape-vines, pine-apples, fibre plants (*Sansevieria*, *Boehmeria*, *Furcraea*), bananas, cacao, Egyptian cotton, coffee, mulberry for silkworms, and fruit trees. The nursery beds contained several hundred small plants ready for distribution, and some ornamental trees and shrubs suitable for shade and shelter.

A short distance from the Botanical Station (on the Skerrits Estate) it is proposed to establish a reformatory school for boys. The labour of these boys is to be chiefly devoted to the growing of provisions and food plants for their own maintenance, and to carrying on experiments in regard to sugar-cane cultivation, on the lines so successfully pursued

at Dodd's reformatory, Barbados. This will give a valuable industrial training to about 300 or 400 boys, and the experimental cultivation carried on by them will prove of great advantage to the Colony. A portion of the same estate, immediately at the back of the town of St. John, is in course of being laid out as a public park. Driving roads were being made through it, and the grass land was being levelled and planted with shade and ornamental trees.

November 27.—After an early visit to the Botanical Station I accompanied the Governor to Wallens, a district in the heart of the hills of the south-west, where a large reservoir is in course of being built to supply the island with water. Antigua has always suffered from want of a continuous supply of water. There are few or no streams, and the only water usually available is supplied from ponds. I was able to offer some recommendations in regard to maintaining the slopes above the reservoir in low grass, and in protecting the ridges of the hills and the declivities where the water collects with shrubs and trees. We afterwards drove to Old Road (near Carlisle Bay), and back to St. John along the coast road to Johnson's Point and Blubber's Valley.

The principal plants noted on this journey were fine specimens of Walnut (*Andira inermis*), the African oil palm (*Elaeis guineensis*), and large numbers of mahogany (*Swietenia Mahagoni*). The latter were badly injured by boring beetles. Plants of the Mocho palm (*Cocos amara*), evidently introduced, were seen near the town reservoirs.

November 28.—I discussed with the Curator, the plan of operations at the Botanical Station, and drew up a form of weekly report to be forwarded to the Colonial Secretary's office. At the request of the Governor, I gave an address in the Court House, St. John, at 3 o'clock, on Cultural industries suited to the circumstances of Antigua. The Governor took the chair. To quote from the *Antigua Observer*, "There were present the Colonial Secretary, the Chief Justice, Bishop Branch, the Members of the Legislative Council, and most of the "leading proprietors and planters." Attention was drawn to the improvement capable of being effected in regard to the sugar industry by the introduction of new canes, and by attention, with the aid of the agricultural chemist lately appointed, to scientific discoveries in regard to a proper system for manuring cane fields, and to an effective and economical treatment of the cane juice. Information was also given on the subject of fibre plants, Egyptian cotton, the cultivation of fruits, coffee, cacao, tobacco, and fodder grasses. At the close of the address resolutions were passed in favour of establishing an agricultural and commercial society for the Colony of the Leeward Islands. This society was proposed to devote special attention to the development of local industries, and to advise the Government in any matters calculated to increase the productive resources of the islands by skilful and systematic cultivation.

After the lecture a visit was paid to the Pope's Head district to the north-west of the town of St. John. This is an undulating tract of country, with a rich retentive soil, where the canes, in spite of the drought, were in very good order.

November 29.—In order to give me an opportunity of seeing the eastern and southern portions of the island, the Governor kindly arranged to drive from St. John to English Harbour, through a district in which there were numerous sugar estates, and where some drainage

works were in course of being carried on to relieve certain low-lying lands of water. In this district it is proposed to establish a large sugar factory or *usine*, with a light railway to bring in the canes from the surrounding estates. The route taken was, first of all, in the direction of Parham, and then in a southerly direction through Liberta village to Falmouth. At Liberta village the land is occupied by small settlers, who cultivate fruit trees and pine-apples. The pine-apples grow very freely on hill-slopes in a black friable loam apparently peculiar to this part of the island. This district produces nearly all the Black Antigua pines exported from the island. The industry is evidently capable of being largely extended. Steps are about to be taken to start a canning factory in order to utilise any fruit that may ripen in the intervals between the mails. The capabilities of raising fruit such as oranges, pine-apples, and bananas in this part of the island are evidently very great.

English Harbour is a naval station maintained by the Home Government for the ships of war on this station. Near it is a large tract of land, about 2,000 acres, belonging to the Government known as Piccadilly. This land is composed of rocky and stony ridges with some glades and valleys. It is in a very dry district, and is liable to severe drought at times. A good deal of scrubby bush is found upon it, and large quantities of the Keratto (*Agave Keratto*) and the Tark's-head Cactus (*Melocactus communis*). On the slopes of some of the hills, where the soil is good, pine-apples might be grown. Fibre plants would thrive on the more stony soils, and possibly cotton in the glades and valleys. If sufficient water were available to provide against seasons of drought, an excellent stock farm might be established here. On the top of the ridge, to the south of this land, and almost overlooking the naval station, there are solidly built, but now deserted, barracks still in a fair state of preservation. Although the district is very thinly populated, and there is no town of importance nearer than St. John, 12 miles away, troops were quartered here up to quite recent times. The naval station of English Harbour is still kept up, and occasionally a man-of-war or a gunboat puts in to clean and refit. When there is no vessel in the harbour the place has a singularly deserted appearance. Clarence House (once occupied by King William IV. when commanding on this station) overlooks the harbour, and is occupied by the commander of the war-ship that happens to be in the harbour. After dining with Captain Rayner, of H.M.S. "Tourmaline," we returned to St. John and arrived there about 11 p.m.

December 1.—Another morning visit was paid to the Botanical Station for the purpose of examining the land in the neighbourhood extending to the southward slope of Cedar Valley Hill. Some experimental cultivation is being attempted here by the Curator, in order to test the suitability of the locality for growing pines and certain kinds of fibre plants. The soil is of rocky character, and, as it has a southern aspect, is probably very hot and dry. The northern slope of the hill is too steep for cultivation, but at the foot there is a large extent of flat land suitable for grazing purposes.

In the afternoon the Governor drove out with me to Parham, a small town on the windward or eastern side of the island. Here two very interesting private gardens, belonging to Dr. Freeland, and his son Dr. F. J. Freeland, were visited. Dr. Freeland had numerous ornamental plants, such as Crotons, Araucarias, Roses, Orchids, and Aroids; while his son devoted his leisure time to the cultivation of ferns and small palms. These were chiefly in pots and sheltered by an

harbour formed of pitch pine covered with creepers. In the village street were some interesting fan-leaved palms, probably *Sabal Blackburniana*.

December 2.—After meeting several planters, who desired information, at the Government offices, I visited a few private gardens in the town of St. John. Mr. Alleyne Archer, an enthusiastic horticulturist, had a very interesting collection of fruit trees and ornamental plants. Amongst the latter were fine plants of *Ipomœa Horsfalliæ*, a large flowered form of *Antigonon leptopus*, numerous plants in pots of the graceful *Thrinax radiata*, which is said to form large thickets in the island of Barbuda, and a very interesting series of *Hibiscus* hybrids. Dr. Edwards had a fine plant in flower of *Porana volubilis*, known locally as the "white corallina," a good plant of *Calliandra purpurea*, originally from Kew, and a grape-vine, Muscat of Alexandria. Bishop Branch, whose diocese extends over 16 islands, 10 English and six foreign, very courteously and kindly took me over his garden. It contains many interesting plants, and, where supplied with water, they are growing luxuriantly and producing a wealth of beautiful flowers. *Methonica (Gloriosa) superba* had established itself thoroughly in this remote part of the world, as also a fine form of *Bougainvillea glabra*, which clambered over high trees.

December 3.—The morning was devoted to a final visit to the Botanical Station. The details of work for the next twelve months were fully discussed, and arrangements made for planting shade and shelter trees on the eastern boundary.

The following contains a short description of the station and of the suggestions made to the Government respecting it:—

The Antigua Botanical Station is situated at Clare Hall (an old sugar estate, late the property of Mr. Liggins), about $1\frac{1}{4}$ miles from Government House, and $1\frac{3}{4}$ from the landing wharf at St. John's.

The site possesses good soil. It is somewhat exposed to the eastward, and will require to be sheltered by growth of mango or other hardy trees. There are three ponds of fresh water on the land; but it will no doubt be necessary to lay pipes on the upper portions to supply the nurseries and propagating sheds.

A house for the Curator is required to be built on the land. At present he lives in town, and is cut off from the immediate supervision of his work.

The arrangement of the plots is shown on a detailed plan left with the Curator. The plants under experimental trial are those which now attract chief attention at Antigua. Plot A will eventually be planted with bananas, and under the shade of these there will be established cacao, nutmeg, cloves, cola, fruit trees and other subjects likely to be successful at Antigua. Plot B, now growing the two varieties of Egyptian cotton, will be permanently established with economic plants of various sorts, grown as models of what such plants should be under proper treatment.

Plot C, on the slope of a rise facing south, is occupied with grape-vines and pine-apples (Black Antigua). Grape-vines do fairly well in Antigua. A fruit industry is sought to be started in grapes for the markets of the United States and Canada. Pine-apples have not hitherto thriven in the northern parts of Antigua. They flourish best in the black soils at Liberta and other places to the extreme south of the island.

The nurseries and propagating sheds at Clare Hall are being gradually established. So far, seeds and plants of economic value are obtained with difficulty, but it is hoped arrangements will be made to secure supplies from Dominica, Jamaica, or Trinidad.

A plot about $\frac{1}{2}$ acre in extent is opened on Cedar Valley Hill, about $\frac{1}{4}$ mile distant from the Botanical Station, in a northerly direction. It contains $\frac{1}{4}$ acre of *Furcræa cubensis* and pine-apples; and another $\frac{1}{4}$ acre of *Sansevieria lanuginosa* devoted to the experimental growth of this plant on a stony calcareous soil.

The Government possesses an extensive tract of country at Piccadilly, near English Harbour. The land is somewhat poor and arid, but it may be utilised for growing fibres and pine-apples, and other parts might be devoted to pen-keeping for cattle, sheep, horses, mules, &c.

The Curator of the Botanical Station, acting under the orders of the Government, has started a small experimental plot with pine-apples and fibres at Piccadilly. An effort will also be made to try cotton there. The arrangement of the present plot is shown on a plan marked D., with the Curator.

My visit to Antigua terminated this evening (December 3). After dinner I accompanied the Governor on board the "Solent" to proceed to Dominica. We touched at Montserrat at 2 a.m., and Guadeloupe at 8 a.m. We arrived abreast of Dominica about 11 a.m., and steamed comparatively close to the shore. The character of the slopes on the leeward side was well seen. Valley after valley opened out reaching far into the interior of the mountains. Thanks to the information kindly given by the Governor it was possible to form a very good idea of the large extent of forest land at Dominica capable of being established with remunerative cultures. The scenery in most of these islands is picturesque, but one is never tired of admiring the loveliness of Dominica.

DOMINICA.

Dominica is the largest and most southerly of the Leeward group. It contains 291 square miles, and has a population of about 29,500. The principal town is Roseau, on the south-west coast. The surface is very mountainous and abundantly clothed with vegetation, and in almost every valley there is a clear running stream of water. The climate is generally cool and pleasant. The rate of mortality is 15.6 per 1,000. The rainfall is abundant and regular. All the high elevations are covered with virgin forests, and only about 20,000 acres out of a total of 186,436 acres are now under cultivation. In fact, this beautiful and fertile island is quite undeveloped. Its industries are purely agricultural, and sugar-cane, cacao, limes, coffee, tropical fruit, and vegetables receive attention. The resources of the island are shown by the export, although at present in small quantities, of ginger, cinnamon, cloves, nutmegs, arrowroot, tous-les-mois, (Canna arrowroot), cassava, logwood, hard woods of various kinds, satin and cabinet woods, canoe-shells, &c.

We landed at Roseau, Dominica, about 2.30 p.m. We were met by Mr. Le Hunte, the President, and walked to Government House, which stands on rising ground to the south of the landing-place. A visit was soon after paid to the nurseries, established on land adjoining Government House pending the acquisition of the land selected for the

Botanical Station. Mr. Green, the Curator, had made excellent progress in raising plants, and the nurseries were in good order. The Gambier plants, landed 10 days previously, had already pushed forth new leaves, and were evidently doing well. Later in the day we drove up some distance into Roseau Valley, to see a new bridge in course of being built, and afterwards took a general view of the land proposed to be acquired for a Botanical Station.

December 5.—Mr. Blanc, Surveyor of Crown Lands, met me by appointment, on the land selected for a Botanical Station at 7 a.m., and the nature, boundaries, and extent of it were carefully examined. In the afternoon a ride was taken along the Windward Road in the direction of St. Joseph. This road is being placed in an excellent state of repair; culverts and bridges are being built. By means of this road a large extent of country will eventually become accessible for wheel traffic.

December 6.—The most interesting and possibly the most valuable portion of Dominica just now, is that stretching in a north-easterly direction from the mouth of the Layou river, on the west coast, to Ance Pagona or Commissioners Bay, on the east or windward coast. It comprises two extensive river valleys with elevations of 500 to 1,000 feet. Portions of these known as the Layou and Sara flats comprise together an area of about 20,000 acres, covered with valuable timber, and watered by a great number of streams joining the Mahaub and Layou rivers on the west, and the Quanary and Pagona rivers on the east side of the island. I was very anxious to see this portion of Dominica, and the Governor kindly arranged for a short visit to-day. The party consisted of the Governor, the President, Mr. Fadelle, the Colonial Engineer, and myself. We left Roseau in the Treasury boat at 7 a.m., and arrived off the mouth of the Layou river about 8.45. We were met here by Mr. Riviere, a leading sugar and cacao planter. After breakfast we started to ride up the valley. At Brook Hill there were noticed growing very luxuriantly some Liberian coffee and nutmeg trees at an elevation of 400 feet. Further up the valley we came to Mr. Riviere's property, where a very simple and effective cacao-house was in operation for curing the produce of the estate. Above this the valley narrows slightly, with steep escarpments on either side. Leaving the main valley, and striking across the country in a north-easterly direction, a good view was obtained of the district. We ultimately reached a point below Cassada Garden, where, owing to the rain, we were obliged to make a slight halt and return. The country is broken up into numerous ravines and low mountain slopes, but it is evidently very suitable for purposes of cultivation. Dr. Nicholls has prepared an excellent account of the resources of the Layou flats for the Government of Dominica, and I cannot do better than refer to that document. I was able to satisfy myself that the country for miles around the route taken by us was covered with luxuriant forest growth, that it was well watered, and that the soil was capable of growing almost every kind of tropical produce. In several places the capabilities of the soil have been tested, as at Cassada Garden, where Dr. Nicholls has a small plantation.

Evidently a good road or light railway is necessary to open up this valuable district, and the subject is now, I believe, under the consideration of the Government. Dr. Nicholls enumerates and describes twelve valuable timber trees abundantly found on the Layou flats, and he states that "the forests of these interior flats contain trees of great value for

“ building purposes, some of them furnishing hard woods and cabinet woods of considerable strength and beauty ; and it is a fact of importance that the trees producing these valuable woods occur in abundance, indeed, it has been pointed out by competent authority that the hard wood trees of Dominica preponderate greatly ‘ over the ‘ fast growing and soft wooded kinds.’ ”

After leaving the Layou valley we rode up the coast road as far as the old town of St. Joseph, and then took boat to Roseau, where we arrived at 7 o'clock.

December 8.—The morning was spent on the land selected for the Botanical Station, with Mr. Blanc and the Curator, Mr. Green. The lines of the roads, and the positions of the nurseries, propagating sheds, tool-sheds, &c. were laid down, and arrangements made for supplying the land with water. In the afternoon a visit was paid, at the invitation of Dr. Nicholls, to the St. Aroment Estate, where cacao, lime trees, Liberian coffee, and numerous interesting plants have been carefully cultivated for many years, first, by the late Dr. Imray, and now by Dr. Nicholls, F.L.S. This place is one of the most interesting spots in the Leeward Islands.

December 9.—Another visit was paid to the Botanical Station, for the purpose of examining the portion of the land proposed to be set apart for the site of a new hotel and for a recreation ground. Later in the day I accompanied the Governor to examine the land belonging to the Government, on the Morne, and to offer suggestions for its management and control.

In the afternoon, at 2 o'clock, I gave an address at a public meeting held at the Court House, on Cultural industries. The Governor took the chair. The topics touched upon related to the particular subjects suitable for cultivation in Dominica. The principal exports at present are :—Sugar, rum, and molasses, 20,290*l.* ; cacao, 12,293*l.* ; lime-juice (concentrated and raw), 8,061*l.* ; fruits and vegetables, 1,363*l.* ; coffee, 398*l.* Limes appeared to be specially suited to the climate and soil of Dominica. From an estimate prepared by an experienced planter it was shown that the cost of establishing a plantation, including the necessary works and buildings, was at the rate of 40*l.* to 50*l.* per acre. At the end of seven years the gross annual return would be at the rate of 18*l.* per acre. On 20 acres, with an expenditure of 1,000*l.*, spread over seven years, a planter, acting as his own manager, could expect to receive, from a lime-estate in full bearing, a gross income of about 500*l.* per annum, yielding a net income of about 250*l.* per annum. In the case of a larger estate the expense per acre would be reduced, and the returns would be correspondingly larger. The cacao industry had greatly extended, and it only required more attention to be devoted to the curing. A large and very valuable fruit industry was capable of being established in Dominica. This only awaits a regular and suitable steam service between the island and the States to enable the people to ship the produce in good order. An account was given of the Gambier plant, and of the conditions necessary to establish regular plantations. The districts of the Layou flats and the Pickard valley were recommended for experimental cultivation with this plant. Particular attention was directed to the objects in view in starting a Botanical Station in the island, and the sympathy and support of all classes were invited to render the work of the Curator as effective and as successful as possible.

Before bringing my visit to Dominica to a close the following summary of suggestions in regard to the Botanical Station were submitted to the Governor:—

The land for the Dominica Botanical Station has been acquired by the Government on a portion of the Bath Estate. It has an estimated area of 40 acres. Within the boundary of the land there are at present six small plots which have been sold at various times. On these are small wooden houses of an unsightly character. It has been suggested to acquire these plots and incorporate the land with that of the Botanical Station. The land lies immediately at the back of the town of Roseau, and about half a mile from the landing place. It is on the right-hand side of the public road leading up the Roseau valley, and terminates near the first bridge over the Roseau river. Immediately above the land, to the south-east, is the Morne, an elevated plateau about 500 feet above the level of the sea. On the edge of the Morne, overlooking the Botanical Station site, are precipitous cliffs, and at the foot of these are easy slopes, suitable for cultivation. The land is of an undulating character, with a rich sheltered hollow immediately under the Morne. In other places the soil is somewhat stony, and not so good for the growth of plants. There is, however, no part of the land not suitable for some cultivation or other. The site is well sheltered from prevailing winds to the south and east. On the northern boundary it is somewhat exposed and will require to be protected by a belt of trees. An abundant supply of water is available from the mains of the Roseau reservoir, which pass through the middle of the land. This water had already been tapped and led in the direction of the spot selected for the nurseries, on the occasion of my visit. There are the remains of stone walls on three sides of the land, and these it is desirable should be repaired and placed in good order as soon as possible. The principal entrance to the Botanical Station should be from the main road, leading up the Roseau valley, and as near to the town as possible.

The plan of the carriage roads through the land has already been discussed and partly carried out. These roads, each of which will be 20 feet wide, will traverse the higher and more gravelly parts, and converge in a circle in the centre of the grounds (where later on a fountain or basin might be placed for the cultivation of aquatic plants). At this spot also seats might be placed under the shade of trees, to allow visitors to admire the view up the Roseau valley or in the direction of the sea. Footpaths will connect the carriage roads with the cultivated part of the land. One footpath will probably be made to pass at a certain height at the foot of the cliffs, to afford a general view of the grounds. The site for the propagating sheds, plant houses, and nurseries has been selected in a sheltered situation and not far from the edge of the depression, with good soil. The depression itself is to be reserved for the permanent cultivation of a set of specimen plants of Liberian coffee, cacao, nutmegs, cola, black pepper, vanilla, gambier, and other plants likely to suit the locality. There are already some bananas, cacao, and lime trees on the land.

As the land is larger than is absolutely required for the nurseries, beds, and experimental plots of a Botanical Station, it may be desirable to lay down such parts as are not immediately required in grass, and plant it with shade and ornamental trees. A few cattle or sheep could then be grazed on these areas.

A portion of the land towards the north-east is suggested as a recreation ground. There is no public recreation ground in the neigh-

bourhood of Roseau, and the acquisition of this site is felt to afford a good opportunity for supplying this want. The total area proposed to be devoted to a recreation ground is about $2\frac{1}{2}$ or 3 acres. This will be entirely away from the cultivated part of the station land, and, if suitable arrangements are made for its up-keep, it will not interfere with it in any way.

Great stress has been laid on the objects in view in establishing this Botanical Station at Dominica. Its function has been defined as strictly of an experimental and economic character, ornamental plants are to be grown in moderate quantities for rendering the grounds attractive and interesting, but chief attention will, it is hoped, be devoted to the plants of an economic or industrial character, and especially those likely to be in demand for establishing new plantations in Dominica. A list of such plants is given elsewhere. Again, the more the cultural operations of every kind are carried on as object lessons for the instruction of the people the better will the station fulfil its mission as an important factor in developing the resources of the island. A large number of very useful and interesting plants already exists in the island at St. Arment, the property of Dr. H. A. A. Nicholls, F.L.S. These have been sent out from time to time from Kew to the late Dr. Imray and Dr. Nicholls, in exchange for Dominica plants kindly contributed at the private expense of the gentlemen just named. The collection is now the best in the Leeward Islands. A list of these plants is given in the *Kew Bulletin* for July, 1887, pp. 10-12. Dr. Nicholls takes a deep interest in everything connected with the development of cultural industries in Dominica, and he has very generously offered the Government, without charge, any cuttings, seeds, bulbs, or plants which can be spared from St. Arment for the purpose of establishing the Botanical Station and for distribution in the island.

After the meeting in the Court House I accompanied the Governor on board the "Esk," and left at 6.30 for the northern islands. It was arranged that I should land at Montserrat and carry out the work of my mission there, while the Governor returned to Antigua to dispose of the mail correspondence. We were to meet at St. Kitts a few days later.

MONTSERRAT.

Montserrat, a Presidency of the Leeward Islands, has a total area of $32\frac{1}{2}$ square miles, and a population of about 11,000. It is composed of a series of rocky hills with conical peaks (2,500 to 3,000 ft.), and from these there are sometimes steep, sometimes gentle slopes reaching down to the sea. The whole surface is broken up into valleys and ravines, with here and there some fertile open country covered with sugar-cane fields. The higher slopes and summits of the mountains are covered with dense forests, with cabbage palms, tree ferns, wild bananas, and valuable timber trees. The principal productions are sugar, lime-juice, sweet potatoes, yams, eddoes (*Colocasia*), pigeon peas, cassava, arrowroot, aloes, ginger, Indian corn, and numerous tropical fruits.

The chief town is Plymouth, on the western coast. The enterprise of the Montserrat Lime-juice Company in growing limes and manufacturing lime-juice has given this little island considerable commercial importance of late years.

December 10.—The "Esk" touched at Montserrat at daylight. I landed at Plymouth with the Commissioner, Mr. Edward Baynes, who had come on board to call upon the Governor, at 7 o'clock.

I first paid a visit to the Botanical Station in course of being laid out to the south-east of the town, close to the sea shore. The spot is very small, but it is the only land available to the Government for the purpose at the present time, and, limited though it be in extent, it can be rendered of great service as a nursery or dépôt for plants and for maintaining a small representative collection of such trees and shrubs as are suitable for growing in the island.

As the Commissioner was unable to accompany me on a general visit to the principal centres of cultivation, arrangements had been made for me to have the pleasure of doing so with the Hon. J. S. Hollings, C.E., a most intelligent and well-informed resident, who was thoroughly acquainted with the country. In addition, I was fortunate enough to receive an invitation from Mr. Hamilton, the able manager of the Montserrat Company, to visit the estates under his charge and have an opportunity of seeing the many new industries in course of being established in the island. We left Plymouth about 9 o'clock, and after riding along the sea shore for a short distance to the northward past Bransby Point, we struck inland and visited the Elberton Lime Estate, where they were gathering their annual crop of limes for making into lime-juice. Owing to the drought the fruits were not so large this year as usual, but the immense golden heaps collected in the fields and near the factory were trophies of a harvest well worth travelling all the way to the West Indies to see them. The West Indian lime (*Citrus medica*, var. *acida*) appears to be a thin-skinned local variety, little known outside the West India Islands. It yields juice of a singularly pure acid flavour, and it deserves to be much better known in this country in the fresh state for making "lemon" beverages, as well as for general use in cookery. The enterprise of the Montserrat Company extends to other things besides limes. Nevertheless, from limes alone it is possible to produce a variety of articles more or less valuable. The limes themselves are exported as gathered, or they are preserved in salt water and shipped in a pickled state for consumption in certain parts of the United States. Lime-juice, obtained by compression, is exported either raw or in a concentrated state. This latter is obtained by evaporating the raw juice in boilers until it is reduced to about one twelfth of the original bulk, when it is ready for export as a dark, viscid substance like molasses. This is used for the preparation of commercial citric acid. From the rind of the fruit, by a process known as "ecuellling," which consists of gently rubbing the fruit on rounded projections arranged inside a brass basin, a very fine essence of limes is obtained. Again, by distilling the raw lime-juice a spirit is obtained known as oil of limes.

From Elberton Estate we travelled further inland through groves of lime trees, and reached Olveston Estate. Here also was a large centre of activity in connexion with the utilisation of the produce of the lime tree. The business of the company was evidently carried on with great energy and enterprise, and Mr. Hamilton, who had formerly been a planter in Ceylon, was thoroughly alive to the desirability of turning to account everything that the land could produce. Some excellent cacao had been cured on the Ceylon method, and while ordinary Montserrat cocoa fetched about 60s. per cwt., this cocoa had been valued as high as 90s. per cwt. There was also some very well cured coffee grown on the hill slopes above. In a small factory close at hand there was in course of preparation the juice of the papaw, to be made into "papaine," or vegetable pepsine. A tree grown in a garden here as mangsteen proved to be a species of *Clusia*, with male flowers only. After lunch

at the Cot, a charming residence on a commanding spur of Centre Hill, a hasty visit was paid to the cacao plantation in the valleys below. The sorts under cultivation were chiefly good Forastero cacao, with here and there a tree of Criollo cacao. These two could easily form the nucleus for a most valuable plantation. From the Cot we rode down through several ravines, with bananas and cacao, to the stock farm, and ultimately to the Company's arrowroot works. Here, with the best appliances and machinery, and under circumstances conducive to the utmost cleanliness, a comparatively new industry for Montserrat was in course of being established. Very fine plants of *Furcræa gigantea*, yielding the Mauritius hemp of commerce, were plentiful in this neighbourhood. They were used chiefly as hedge plants. An elementary school for negro children is maintained by the Montserrat Company in the neighbourhood of their estates. It is said to be one of the best in the West Indies.

We now travelled in an easterly direction, and visited Water Works sugar estate, owned by Mrs. Kirwan. In the valleys above the house was a small but very promising cacao estate. On the ridges of the hills were clusters of an interesting native palm (*Cocos amara*) with the habit of the cocoa-nut. The fruit is about $2\frac{1}{2}$ inches long. After traversing one or two deep valleys we arrived at Richmond, Mr. Hollings' estate, at nightfall. Mr. Wade, the Curator of the Botanical Station, brought up a sketch plan of the ground, and arrangements were made to have the paths and beds pegged out, ready for my inspection the next day.

December 11.—Leaving Richmond at 7 a.m., and again accompanied by Mr. Hollings, it was arranged to cross the island and see something of the windward side. It was afterwards proposed to take a southerly direction and ride round the *soufrière* into Plymouth. As will be seen later, this part of the programme was not possible to carry out in the time. From Richmond the road was through Dagnam Estate up to the great saddle of depression between the Centre Hill (2,450 feet) and the Soufrière Hill (3,002 feet). This is the main line of communication between the leeward and the windward sides of the island. The road at its highest point crosses the ridge at about 1,200 feet. Along this road excellent views were obtained of the country on both sides of the ridge. In addition to the regular sugar estates, of about 200 or 250 acres each, there are numerous thriving negro villages where the land is held by small freeholders. In the neighbourhood of these there are patches of fruit and provision grounds in a good state of cultivation. Sweet potatoes, yams, eddoes, pigeon-peas, and fruits and vegetables of island production are cheap and abundant. It is estimated by Mr. Hollings that there are about 1,200 negro freeholders in Montserrat, owning lots varying from one to five acres each. In the cooler climate of the hills many of the northern fruits and vegetables could be grown, but as there is little or no demand for them in the island, and as the facilities for shipping them are fitful and uncertain, they receive little attention at present. On the windward slopes the country is much broken up into deep ravines and rocky defiles. The soil in the valleys is, however, very rich, and where these are wide and sheltered from prevailing winds they offer excellent localities for purposes of cultivation. The sugar estates occupy slopes and declivities close to the sea. The climate is cooler than on the leeward side, and the air more bracing. At Hermitage, a representative sugar estate, Mr. Wilkins was good enough to show us his cultivation. He had tried the Caledonian Queen, or St. Kitts' cane, on one of his fields, and it had stood the drought much better than any of the other canes. Young cocoa-nut palms were in a very

flourishing condition. In a deep ravine, reaching up to the mountains, a young cacao plantation was in course of being established. Where not exhausted by the cultivation of provision grounds the soil was good and the plants healthy. In deep valleys of this kind cacao evidently requires little overhanging shade. It practically requires nothing more, after it has started, than shelter from strong winds. In this case the winds came up the valley from the sea; hence shelter belts of galba (*Calophyllum Calaba*) or pois-doux (*Inga laurina*), planted across the trend of the valley would afford the best protection possible. The vegetation in the upper reaches of these deep Montserrat valleys is very striking and luxuriant. Huge trees, with slab-like buttresses, grow on the sides, and these are literally clothed with masses of aroids, ferns, and bromeliads. Depending from their upper branches are numerous lianes and climbing plants, forming festoons of green leaves, relieved here and there by the bright flowers of Ipomœas and Bignoniads. On the tops of the mountain slopes the trees are shorter, with more coriaceous leaves, and covered with masses of mosses and lichens. Here also are numerous tree-ferns and mountain palms, and the ground is carpeted with lycopods and selaginellas.

As I was due at Plymouth early in the afternoon the proposed expedition to the south and round the Soufrière had to be given up. In order, however, to see another district of the island the return journey, which proved a very interesting one, was made over Windy Ridge and back to Richmond, on the other side of St. George's Hill.

At the desire of the Commissioner and the Legislative Council I met a number of the leading proprietors and planters at the Court House, Plymouth, at 4 o'clock, and gave an address on minor industries. The Commissioner took the chair. At this meeting a large number of negro freeholders was present, and they appeared to take great interest in the proceedings. A collection of plants and specimens had been brought together to illustrate the lecture, which resolved itself into a demonstration of methods necessary for pruning and treating different kinds of economic plants and putting up produce, such as bananas, oranges, pine-apples, for shipment.

I again visited the Botanical Station, and the following report upon it was afterwards presented to the Governor:—

The Montserrat Botanical Station is in course of being established on a small plot of land, originally about two acres in extent, to the south-west of the town of Plymouth. It is close to the sea, and about a quarter of a mile from the landing place. It is sheltered on all sides, except that facing the sea beach. A public road runs between the station and the sea, formed out of the original two acres bought by the Government. At the back the land is bounded by a somewhat steep slope about 30 or 40 feet high composed of stone and gravel. This slope is not altogether included in the station ground. It is desirable, however, for the sake of keeping it in order, and forming a suitable background to the cultivation carried on at the Botanical Station to acquire the whole slope or at least to lease it at a nominal rent. It can be of little or no value to the present owner. The boundary on the north side is in contact with some negro huts and waste ground. This boundary should be protected by a barbed wire fence and live posts to keep out trespassers. A good fence of Galba or Lime trees should ultimately be established here. Between the station ground and the public road a rustic fence has been constructed, which appears to answer very well for the present. An entrance to the Station is necessary at the nearest point to the town, and a suitable gateway placed there. The drain or watercourse constructed to carry off the

water from the gully in the north-east corner should be walled and paved; and in addition to the present steps, a small rustic bridge might be constructed. A constant supply of water should be distributed everywhere over the station. This is a most important matter and one requiring early attention.

The present Curator, Mr. Wade, was formerly a gardener to Capt. J. H. H. Berkeley at St. Kitts. He has been in the West Indies for nearly 10 years, and is described as a hardworking and a successful gardener. So far as I was able to judge of Mr. Wade after a two days' intercourse with him, I am of opinion that he is competent to carry on the work of the Botanical Station. He should, however, be placed under the immediate control of the Commissioner or some other responsible person, and be encouraged by personal intercourse to take an interest in his work and devote his energies entirely to the duties of his post.

An outline sketch of the manner in which the ground could be laid out was left with Mr. Wade. Immediately adjoining the barbed wire fence to the north, and to the left of the entrance walk, there is soil suitable for a nursery, propagating sheds, and tool shed. Adjoining this, and to the right of the entrance walk, a small banana plantation might be established, to be used as shade for other plants. Beyond this, to the south-west, would come the watercourse, and then a series of beds about 10 feet wide, divided by walks three feet wide. These beds could be devoted to the experimental cultivation of specimen economic plants, all of which should be legibly named. Pine-apples might be planted on the dry stony soils to the extreme west, and also at the foot of the slope. The slope itself might be covered with trees and shrubs of an ornamental character or with Agaves, Cacti, or other plants capable of bearing dry arid conditions. Parallel to the rustic fence adjoining the public road, a border of ornamental plants might be established to give the ground an attractive appearance from the outside. As may be readily gathered from its very small area, this Botanical Station cannot be utilised for much cultivation of an experimental character. Its functions must necessarily be very limited. It should be devoted to the raising of economic plants from seed or cuttings, and to the importation of any special plants from other institutions. It is possible, however, for it to do a great deal of good in this way, and especially if a few specimen plants are well cultivated at the Station for the instruction and observation of the people. The Curator, under such circumstances, should endeavour to place his knowledge of horticultural methods at the disposal of those anxious to become acquainted with them. He should train a few boys as gardeners, and do all that is possible to aid in the development of local industries.

A large number of economic plants already exist in gardens in the island, and the Curator should endeavour to obtain these and establish them at the station before taking steps to introduce others on a large scale. Further, he should make himself well acquainted with the number and character of the economic plants producing seeds or available for cuttings, and so utilise to the best advantage the local resources of the island.

As Montserrat possesses about 1,200 small settlers, with holdings from 2 to 5 acres each, it is very desirable to influence them to take up the permanent cultivation of fruit, spices, cacao, coffee and other products in large demand. In this work the Curator should take an active part.

Immediately after the address it had been intended that I should leave for St. Kitts in the schooner "Georgiana." As, however, the cargo steamer "Mirima" had arrived and was leaving for St. Kitts in

a few hours, Mr. Cowie, the agent, was kind enough to arrange for a passage for me in the latter vessel. I went on board after dinner, and arrived off Basseterre, St. Kitts, early next morning.

ST. KITTS-NEVIS.

ST. CHRISTOPHER.—The three islands of St. Christopher, Nevis, and Anguilla form one Presidency, called the Presidency of St. Christopher and Nevis. St. Christopher (or more commonly St. Kitts), lies north-west of Montserrat; it contains 68 square miles and a population of about 30,000. It is a long narrow island somewhat bottle-shape in outline, with the neck pointing towards Nevis. The main portion is between 12 and 13 miles long, and contains several peaks and ridges culminating in one massive peak called Mount Misery (4,060 feet). On each side of the central ridges are rich slopes broken by numerous ravines stretching down to the sea. These slopes present a very cultivated appearance. First come rich expanses of cane-fields with the houses and works nestling among trees, then the higher slopes with the deep verdure of grass lands, and, ultimately, the summits of the peaks and ridges covered with dense forest. The soil of St. Kitts is very rich and productive. It consists of a fine loam, easily worked, with a porous substratum of gravel or disintegrated volcanic rock. In some districts on the higher slopes there is a tenacious red clay, while in the valleys below a sandy loam is prevalent.

St. Kitts is a bright and interesting island. It is very healthy, and the people are enterprising and intelligent. It can grow almost everything suited to the tropics. Its only drawback is an occasional season of drought, when, owing to the porous nature of the soil, vegetation suffers considerably.

There are 135 sugar estates, containing 18,507 acres of arable land. The chief productions are sugar, molasses, sweet potatoes, cassava, ground nuts, pigeon peas, a little coffee, cacao, and tobacco. English vegetables are readily grown at nearly all elevations. The principal town is Basseterre, with a population of 10,000 inhabitants. It possesses several good buildings, including a fine church and court house and an attractive public square and garden.

NEVIS.—The island of Nevis lies south-east of St. Kitts, from which it is separated by a channel about 2 miles wide. Nevis is circular in outline, contains 50 square miles, and a population of about 12,000. About one-half of its 32,000 acres is, or has been, under cultivation. Nearly in the centre of the island rises a majestic peak (3,200 feet) with a dark wooded crater. The slopes of this are at first steep and covered with forest, they then become gradually less steep and undulating, and at last spread out all round towards the sea. The soil of Nevis, derived from the decomposition of crystalline trachytes, is more clayey than that of St. Kitts. On that account it is less easy to work, but it is by no means unfertile. Sugar is the chief product, but a large number of other articles are in course of being experimentally grown. Nevis differs from St. Kitts in the larger number of small proprietors it contains. These cultivate ground provisions and fruits, and, if suitable facilities existed for shipping them, Nevis might become much more prosperous than it is at present. The chief town is Charlestown; this is 12 miles by boat from Basseterre in St. Kitts. A small Government steamer is about to be placed on the service between the two islands.

December 12.—On landing at St. Kitts, I went up to Government House and joined the Governor, who had arrived the day before by the mail from Antigua. After breakfast we drove out to inspect land, under the consideration of Government, to be acquired as a site for a Botanical Station. The first was the land immediately opposite Government House. This was very suitable in regard to soil and position; but was entirely unsuitable on account of the exposure to strong winds. The locality was perfectly flat or slightly sloping towards the south, with no shade or shelter, and it was fully exposed to winds from all quarters. In the comparatively dry climate of this portion of St. Kitts, shade and shelter are absolutely necessary for the growth of tender plants in the plains. Probably no plants except sugar-canes could thrive in such situations during so dry a season as that of 1890-1891.

Another locality visited was to the west of the town of Basseterre, and between it and the site of the signal station and battery. This was somewhat close to the sea, but the soil was good, and a sheltered hollow near the high road, where the canes were growing most luxuriantly, offered an excellent situation for a Botanical Station. A fuller description of this locality is given later. Owing to the absence of a site for a Botanical Station, Mr. Plumb, the Curator, appointed in 1889, had started nurseries and a plant depôt on land placed at his disposal, adjoining the residence of the Commissioner, Captain Churchill. This situation was very dry and so exposed to hot winds that it could only be utilised as an expedient of a temporary character.

At 3 o'clock I delivered an address at the Court House. The Governor took the chair. The subjects touched upon in the address are briefly summarised in *The St. Christopher Advertiser* of the 16th December 1890, as follows:—Mr. Morris "spoke of the advantages likely to arise if the Leeward Islands would put forth efforts to improve their staple industry [of sugar], and to encourage the starting of new industries. He sketched the activity displayed by Kew and its kindred institutions in the Colonies, and urged the desirability of encouraging the scheme for Botanical Stations, and the formation of an Agricultural Society, instancing the benefits which have accrued to [Trinidad], Jamaica and other countries from such institutions. He described fully and clearly the discovery of the cane-seed, and his illustrations of the 'arrow' or flower of the sugar-cane were most interesting. He then directed attention to the cultivation of coffee, cacao, and fibres, and suggested that every endeavour should be made by the Colonists to show what the capabilities of these islands were, and to invite capitalists to invest their money in the cultural industries of the West Indies."

After the lecture was over, I accepted an invitation from Captain J. H. H. Berkeley to visit Shadwell and see some of his experimental cultivations. Potatoes and tomatoes had been successfully grown on cane lands and shipped to the United States as early as December of each year. The only drawback to the development of a large industry in these articles, had hitherto been the length of the voyage from Basseterre to New York. The reports of the agents had invariably been, "if these could have arrived two or three days earlier, they would have been in excellent condition and realised good prices." Captain Berkeley deserves great credit for his enterprise in this and similar matters. He has shown the way to many new industries, and if the improved shipping facilities now under the consideration of the Government are fully carried out, it would be possible to embark in

many enterprises connected with the supply of early fruits and vegetables to the northern markets and secure satisfactory results.

December 13.—A more detailed examination of the proposed site of the Botanical Station was made this morning, and a conference held with Mr. Plumb in regard to its suitability for nurseries and the cultivation of plants. There appeared to be no other locality within a short distance of the town of Basseterre possessing the necessary advantages of good soil and shelter. A ride was taken in the direction of Milligans and Fountains, and a good view obtained at an elevation of about 1,200 feet of the sugar lands of St. Kitts and of the vegetation of the higher slopes. In the ravines were growing very handsome tree ferns, the stems of which were largely used as fence posts. Numerous small ferns clothed the sides of streams and gaily flowered plants such as *Columnea* and *Alloplectus* hung in tresses from the trees. The dense forests of St. Kitts from 1,500 feet to 3,000 feet have evidently not been fully explored. The climate at this elevation was cool and pleasant. Mr. Napier, at Fountains, had a large kitchen garden with green peas and European vegetables in full bearing 12 days before Christmas. With intelligent care and a sufficient supply of water, it is possible to grow almost any kind of vegetables at St. Kitts. The soil is of a fine loamy character, easily worked, and very productive. St. Kitts still deserves its old Carib name of "Ilinga," or the fertile isle.

After lunch, at the request of the Governor, I visited some low-lying land to the east of the town of Basseterre, in course of being drained and reclaimed. This locality was formerly a swamp, and being to the windward of the town, caused some unhealthiness. Efforts likely to be in every way successful are being made to cover it with grass, and plant trees upon it. In time it should be available as a recreation ground or a public park. I offered suggestions for the treatment of the land, and recommended trees, such as the Guango (*Calliandra Saman*) Coconuts, Java Almond (*Terminalia Catappa*), and certain wild figs as shade and shelter trees. As the soil gradually dries up and loses the salt contained in it numerous other trees might be grown there.

Owing to the pressure upon my time it was impossible to arrange for a visit to the island of Nevis. I was able, however, to meet several persons interested in the industries of Nevis, and to offer some hints in regard to them.

The permanent land for the Botanical Station had not been acquired at the date of my visit. The Curator, Mr. Plumb, had, however, been engaged in raising plants in pots and in nursery beds on a small piece of land adjoining the residence of the Commissioner. This land contained very poor soil, was exposed to dry winds, and had only a moderate water supply. In spite of these difficulties, the Curator had raised several hundred plants of different sorts, and many valuable economic plants were ready for distribution. The success so far attained by Mr. Plumb's efforts showed that he was fully alive to the special work required of him at St. Kitts-Nevis, and I have little doubt that when the land for a permanent station is acquired he will be competent to deal with it. He has a good knowledge of tropical economic plants, and could afford useful information respecting their culture and treatment.

As regards the land for a permanent Botanical Station, the Government had before them two possible sites. One was a flat piece of land immediately in front of Government House, and divided from it by a public road. It formed a part of the gradual slope to the north of the

town of Basseterre, and about a mile distant from the landing place. This land, cultivated as part of a sugar estate, contained some good soil, it was easily accessible from the town of Basseterre, and if in other respects suitable would have contributed to the amenities of Government House, and attracted many of the visitors who call from time to time on the Governor. The land had, however, some serious defects. It had a plain unbroken surface, and sloped in the direction of the prevailing winds. It was absolutely without any protection whatever from the north and north-east, whence blow during the greater part of the year strong dry breezes most inimical to plant life. Even with shelter belts grown after many years of persistent effort it would be impossible, I believe, to provide adequate protection, and the necessary humidity in the air to plants on this site. Further, it was liable to be washed away by any catastrophe such as happened at St. Kitts a few years ago, when a disastrous flood did considerable damage within a short distance of this land. I arrived, therefore, at the conclusion that the land was altogether unsuited for a Botanical Station.

The only other site to which my attention was called as likely to be available, was situated to the west of the town of Basseterre, and this also formed part of a sugar estate. It was close to the sea-shore, and extended inland by a series of gradual slopes, all of which were under cultivation. A considerable portion of this land was intended to be acquired by Government for the purpose of extending the town in this direction, and of affording a much needed expansion of the area available for building purposes. I carefully examined this land on two occasions with the view of finding out whether any portion of it was suited for the purposes of a Botanical Station. The rocky land of a broken character to the extreme west was obviously out of the question. The same remark, but for other reasons, applies to the higher portions of the land extending in the direction of the public hospital. In the one case the situation was too dry and exposed; in the other it possessed many of the disadvantages already noted in regard to the land opposite Government House. One portion of the land to the eastward nearest to the town of Basseterre was, however, found to be far more promising. This consisted of a sheltered depression with good soil extending in a line parallel with the sea. The extent of this sheltered land may not be more than 6 to 8 acres. If suitable arrangements are made by throwing up banks, planting live fences, or building good stone walls along the north and north-eastern boundaries of this land it might be rendered very suitable for a Botanical Station. There is a sufficiently large area of good land here for nurseries and experimental plots, and the spot known as "Cholera ground," forming the western limit of it might be laid down in grass and planted with ornamental and shade trees. At present this spot is, and has been for the last 20 or 30 years, under cultivation in canes.

I am fully aware that the land here is very near the sea, and on that account may not prove suitable for the cultivation of many plants that thrive only in elevated places inland. I am aware, also, of the comparative dryness of the sea-coast lands at St. Kitts, and further of the sentimental objection that may exist with regard to associating the Botanical Station with the so-called cholera ground. It must be remembered, however, that according to general consensus of opinion of engineers, doctors, and others, the only possible direction in which the town of Basseterre can be safely extended is to the westward. This neighbourhood will eventually become an important suburb of the capital of the island, and contain some of the best residences dotted about on the ridges above. The grounds of the Botanical Station below

will thus naturally prove a source of attraction to an important section of the community, and be easily within reach of all. It will be distant about a mile from the landing place at Basseterre. In the event of this land being acquired, I have already discussed with Mr. Plumb some of the preliminary operations necessary before the station can be satisfactorily established upon it. A sketch outline of the boundaries and roads was prepared, also the position of the office, tool-sheds, nurseries and experimental plots. The great point is to secure adequate shelter from prevailing winds. The next is to secure an unfailing water supply distributed over the whole surface. And lastly, advantage should be taken of the good soil in the hollow to lay out there the nursery beds and experimental plots. The other portion of the land could be laid down in grass and shaded with trees.

As regards the experimental plots, taking into account the fact that the principal industry of the island is sugar, and that the planters are very anxious to increase the yield per acre, the Curator might carry on investigations in regard to sugar canes on the following lines:—(1) the relative merits of different varieties of canes, (2) the effect of certain manures on sugar canes in increasing the yield of sugar, (3) raising new varieties of the sugar-cane from seed, and (4) observations on plants and on insects injurious to the sugar-cane.

The work of the Botanical Station at Barbados might usefully be followed in this respect at St. Kitts; and if an agricultural chemist is appointed, the latter might be invited to join the Curator in watching and recording the results in a systematic form for the information of the St. Kitts' planters. These experiments, when in full working order, might be carried on in part only at the Botanical Station. They might be carried on more fully on some estate close at hand, where facilities are available for crushing the canes and obtaining results on a larger scale. The other experimental plots might be devoted to the growth of Egyptian cotton, tobacco, vanilla, trees yielding tanning substances, fibre plants, fruit trees, cacao, Arabian coffee, Liberian coffee, arrowroot. It is desirable, to save expense, that only a few plots be worked at one time. The nurseries should, however, contain a good supply of all plants likely to thrive in the island, and specimens of each should be established on the station land, and cultivated according to the best methods adopted in other countries.

Some of the indigenous plants of St. Kitts are very interesting. All likely to thrive in the lowlands should be established at the Botanical Station, and the Curator might be encouraged to make collections both of living and dried plants illustrative of the flora of the island. For this purpose he should be provided with a horse and a "modified horse allowance."

The Botanic Station at St. Kitts will probably be found unable to meet satisfactorily the requirements of the island of Nevis. A plant dépôt, or possibly another station, will eventually be required there. Nevis is essentially an island of small settlers, and these people are likely, if encouraged, to take up the cultivation of fruit and vegetables, and supply freight for the new steamers proposed to be established between the Leeward Islands and New York. For the present the Curator might visit Nevis at certain intervals, and make himself thoroughly acquainted with its circumstances and requirements. He will then be in a position to judge exactly whether these latter can be met from the St. Kitts Station or not.

This evening, at the request of the Governor, I embarked with him on board H.M.S. "Partridge" (Lieut.-Commander Noel, R.N.) for the

purpose of visiting the island of Anguilla. This island, owing to a prolonged drought extending over nearly a year, was in a very critical state, and the people, about 3,000 in number, were reported as almost in a starving condition. The Legislative Council of the Presidency had voted certain sums of money from time to time towards alleviating the most urgent cases of distress, and if rain came it was hoped that some early maturing crops would be possible to be grown. The "Partridge" left Basseterre about 6 o'clock, and coasted along the leeward shore in the direction of St. Eustatius to the north-west. From whatever point of view one looked upon St. Kitts it presented a singularly bright and cultivated appearance. Later in the evening, when storm clouds broke over the top of Mount Misery, the fanciful resemblance of mountains and clouds to the figure of St. Christopher noticed by Columbus was fully realised. St. Eustatius, celebrated for "its most perfect crater possible," making up five-sixths of the island, was passed during the night, as also Saba, where a community of Dutch and negroes lives in the bosom of an old volcano, with only one small landing place and a stair leading up 800 feet into the town.

Early the next (Sunday) morning we found ourselves passing Dog Island and Prickly-pear Cays, outliers of Anguilla, and making for Crocus Bay, an open roadstead well sheltered from the north-east trades. The coast line at this point was about 150 feet high, formed of, probably, tertiary calcareous marls. On the highest point was a neatly built court house, with a flag-staff and signal station. Below the cliffs in this spot was a small margin of beach with bright glistening sand, suggestive of those curious nullipore sands formed from the calcareous skeletons of certain algæ.

ANGUILLA.

Anguilla (little snake) belongs to the Presidency of St. Kitts-Nevis, and is distant 60 miles north-west from the former island. It contains 35 square miles, and a population of 3,000. It is a long, narrow island, somewhat flat, and in its physical features singularly uninteresting. The elevations are chiefly along the coast, the interior recedes from the coast, and forms a basin-like depression. In recent books, descriptive of the West Indies, it is stated that there is a salt lake in the centre of the island. If this occupied the basin-like depression above mentioned, this lake must have disappeared many years ago. The island is fully exposed to the trade winds, which sweep over it with considerable force during the greater part of the year. There are few or no swamps, and the place is extremely healthy. The energies of the people are chiefly devoted to the manufacture of salt, to raising ground provisions, and to rearing cattle, ponies, and small stock. These are shipped to St. Thomas, where they find a ready market.

December 14.—The Acting-Magistrate of Anguilla, Mr. Edwin Baynes, came on board to receive the Governor, and it was arranged we should land immediately after breakfast. On going ashore we were supplied with ponies, and we first of all attended service at the Anglican Church. After service we rode in the direction of the cultivated portions of the island and saw the remains of gardens and provision grounds that had been completely abandoned on account of the drought. A little rain had fallen the previous week, but it had done little to moisten the soil, which was dust-dry to a considerable depth. We went on board for lunch and returned immediately after. The Governor held a conference with the principal inhabitants to devise means for alleviating

the destitution of the people, while, at his request, accompanied by Captain Noel, I made myself acquainted with the character of the country, with the view of suggesting some plants that would be likely to thrive in so unpromising a country. We first of all examined a large district to the north of the Settlement. The surface here was almost entirely covered with a porous limestone, in the cracks and fissures of which some trees and shrubs of a scrubby aspect managed to grow. Here and there in glades were some patches of a shallow red soil formed by the disintegration of the limestone. In this soil, during such seasons as moderate rain fell, the people grew cassava, pigeon-peas, sweet potatoes, okro. At the time of my visit, hardly anything green was seen except some species of *Agave*, *Opuntia*, *Cereus*, and the vegetation peculiar to rocky cliffs in the tropics. The gommier (*Bursera gummi-fera*) was the largest tree seen, while small stunted plants of *Eugenia*, *Phyllanthus*, *Elæodendron*, and weedy looking Crotons formed the bulk of the undergrowth. Such land was evidently useless for purposes of cultivation, except for occasional and precarious food crops, and these could only be satisfactorily grown during seasons when there was a plentiful supply of rain. Some of the brushwood was capable of being converted into charcoal, but there was no market nearer than St. Thomas, and the means of communication were few and far between. Some grass was growing here and there in cool hollows, and the goats, cattle, and horses, if supplied with water, could pick up a somewhat scanty existence. More might be made of the patches of land suitable for pasturage purposes, for some kinds of grasses are known to thrive where almost every other vegetation fails. We rejoined the Governor at nightfall and went on board. It appeared that the privations at Anguilla were not entirely owing to the drought. A large number of the men had been regularly employed in digging phosphates on the island of Sombrero. Their employment there, however, had suddenly ceased, and this, combined with the prolonged drought which had overtaken them at Anguilla, had left them almost destitute.

December 15.—We landed this morning soon after 6 o'clock. We went off into the interior of the island in a north-easterly direction towards the revenue hut near Sandyhill Bay. The country here sloped gradually towards the eastward, was less rocky, and in one or two depressions there were the remains of sugar estates which had been in cultivation within the last 30 years. The soil was fairly good and there was some shelter from wind. The trees in this neighbourhood were larger and finer than those seen the day before, and water was obtainable from deep wells even in the driest weather. Careful search was made for any plants in the island that would be likely to afford the means for starting a fibre industry. There were numerous species of *Tillandsia*, *Pitcairnea* and other plants of this character on rocks and trees; but only one species of *Agave* was found, and that was, unfortunately, one that yielded a very inferior class of fibre. It was useless, therefore, to attempt the systematic cultivation of this plant. After considerable difficulty, one plant of *Furcraea cubensis* was found on land to the north-west. This it appears had been introduced there. The leaves were of good length and texture, and the fibre was excellent. It was evident that if two or three thousand acres of absolutely useless land in Anguilla could be established with fibre plants in a few years an important industry might be started there. The cost of clearing the land, if started as relief work, would be very small; while plants could be obtained from Antigua, Jamaica, or some other islands to the south.

From the number of wells existing in various parts of the island, it is evident that it should be possible to obtain a supply of water all the year round. The public well near the Settlement, lately placed in a state of thorough repair by Government, yielded at the end of a prolonged rainless season, an abundant supply of water. In other parts where the wells were private property they appear to have been neglected and become useless. It is well known that in eastern countries where there are seasons of prolonged drought, water for irrigation purposes is obtained from wells. By such means large crops are regularly raised, and the cultivator is almost entirely independent of the seasons. At Anguilla, where the trade winds are so regular, motive power for pumping well water might be obtained from Canadian wind-mills or by horse or cattle labour. The matter is well worthy of consideration. The people as regards agricultural matters have an air of shiftlessness about them which is very unlike the patient plodding habit of their eastern brethren. If water for irrigation purposes could be placed at their disposal, there should practically be an end to these periodical visitations of short crops and privations.

Although the greater part of the land at Anguilla is rocky and poor, there are scattered patches capable of cultivation, but the present race of people is quite incapable of initiating anything more than will provide them with the barest necessities of life.

From the north-east coast we retraced our steps in the direction of the Settlement and made for Blowing Point, on the extreme south-west of the island. For some time we could look across a narrow strait separating Anguilla from St. Martin. This latter (a slightly larger island than Anguilla) is divided between the French and Dutch. The French coast faces that of Anguilla. It is more hilly than the British island, and appears to have suffered less from drought. There is a regular traffic in small boats maintained between the two islands, and smuggling (looked upon as a very venial sin indeed in these remote places) is somewhat prevalent. Before arriving at Blowing Point, an interesting little palm was found growing on broken limestone rocks. It was present in fairly large quantities, and the fan-shaped leaves were used for thatching native huts. The chief interest attached to this palm is connected with its dwarf habit. The largest and apparently most matured specimen did not measure more than about 30 to 35 inches in height, and the stem was about $2\frac{1}{2}$ inches in diameter. I was unable to find any plants in flower or fruit, but there was no doubt it was a species of *Thrinax*. I brought away with me about 30 to 40 plants to be established at the Botanical Stations at Antigua and St. Lucia. The largest specimen was reserved for the Museum of Economic Botany at Kew, where it was lately seen by Herr Wendland, an authority on palms, who is of opinion it is new to science. He has suggested a name for it, but this cannot be published until some of the flowers or fruits are obtainable for a botanical description of the species. It is somewhat singular that only last year a new dwarf species of *Phoenix* of similar habit was discovered in the East Indies, a specimen of which is now growing at Kew. This is likewise about 25 to 30 inches high with a slender stem, and forms a very attractive plant. The Anguilla *Thrinax* is not yet introduced in the living state to this country, but when it is there is little doubt it will prove most interesting and attractive in a horticultural sense. I made, as mentioned above, a special search for flowers or fruit of this plant. I was told that it produced a very pretty pink flower. This, when produced, proved to be an epiphytal orchid, a species of *Epidendrum*, which attached itself to the stem of the small palm and pushed its flowers through the fronds. The nearest species to the

present plant is probably *Thrinax radiata* found at Barbuda and other localities in the Leeward Islands. That, however, grows to a height of 15 to 20 feet, and forms a stem 3 or 5 inches in diameter.

After passing Blowing Point we descended to sea-level and visited the salt pond near Road Bay. Salt-making is practically the only important industry in the island, and unfortunately just now it is rather a precarious one. The lessee pays the Government a rent of 200*l.* per annum for the right of making salt, but the success of the crop depends so much on the weather that there is no opportunity of employing more than a very limited number of people. We were unable to continue our way along the sea-coast to Crocus Bay, so had to ascend a steep escarpment and traverse a rugged path across the country in the direction of the Court House. When we arrived there the Governor held an informal levee, and patiently listened for more than an hour to those who wished to bring their grievances before him. After this he gave an address to the people, and explained carefully to them the arrangements made for carrying on relief works. These in the first instance were to be started in connexion with the repairs of the roads, and afterwards extended, if found absolutely necessary, to the clearing of land for a fibre industry. An offer was made to the able-bodied to find work for them at St. Kitts or Antigua, and transfer them and their families to estates where they would have cottages free and regular wages. Very few seemed disposed to accept this offer. The Governor added that the very aged, the infirm, and young children only were to be supplied with food without labour. Seed for planting was proposed to be distributed in order to enable early crops of peas, beans, and corn to be raised.

We went on board the "Partridge" early in the afternoon. We immediately got under way and made for the Virgin Islands. It was hoped we should have time, at least, to touch at Tortola, 90 miles away, and then push on to catch the mail steamer due to leave St. Thomas for the southern islands on Tuesday evening. There was a moderately rough sea during the night, but at daybreak we were well within reach of the outer fringe of the Virgin group.

VIRGIN ISLANDS.

The Presidency of the Virgin Islands consists of 30 to 40 small scattered islands to the east of Porto Rico. Geologically speaking they form a submarine prolongation of the mountain system of that island. The total area is about 58 square miles, and the estimated population under 5,000. The principal members of the group are Tortola, Virgin Gorda, and Anegada. The latter, as its name implies (the inundated), is merely a low reef elevated a few feet above the level of the sea. It has an area of 14 square miles. Tortola, 26 square miles in extent, is composed of hills, the highest of which rises to nearly 1,600 feet. The surface is much broken up into ravines or "gullies," and nearly the whole of it has been under cultivation. Virgin Gorda, 10 square miles in extent, is also hilly, but less fertile than Tortola. Copper mines have been worked here, but at present they are not productive. The inhabitants of these islands are hardy and skilful seamen. The climate is cool and healthy. Hurricanes occur at intervals, and are very destructive. The principal productions are coarse sugar, cotton, and ground provisions, which are sold at the Danish port of St. Thomas. Fishing is largely pursued, and poultry-raising is very successful.

Road Town, a small place on the south side of Tortola, is the capital of the group.

December 16.—The navigation amongst the Virgin Islands, owing to the presence of reefs and currents, is very difficult, and requires great care and judgment. Although we sighted the islands at daybreak, it was nearly 8 o'clock before we arrived off Road Town, the chief town and seat of Government of the Virgin Islands. From the harbour it presented a broken-down and ruinous condition, evidently the result of the terrible hurricanes of 1867 and 1871. Soon after we dropped anchor, the President, Mr. Edward Cameron, came on board, and the Governor, the private secretary, and myself went ashore. While the Governor was engaged on public affairs I was fortunate enough to have as guide, Mr. Campbell, the Colonial Surgeon, who kindly lent me a pony and took me first of all to the top of the ridge. The land appeared to have been cleared at one time and cultivated with great enterprise. The remains of sugar works were still seen, but the cultivation had long ago given place to coarse grasses, tropical weeds, and scrub growth of an uninteresting character. The soil was evidently good, and on the hill slopes it could maintain excellent pasture grasses. An Agave, which, according to Baron Eggers is *Agave Morrisii*, Baker, the Keratto of Jamaica is found abundantly everywhere. An attempt was being made by Mr. Campbell to start a fibre industry in connexion with this plant. If, as is supposed, it is identical with the Jamaica plant, the fibre is not of great commercial value. The reports received respecting fibre prepared from it by the Death and Ellwood machine at Jamaica were by no means satisfactory. The reports were as follows:—

- (a.) *Keratto fibre*.—This fibre is of little strength, and is undesirable ; value 12*l.* to 14*l.* per ton ; it is not an even fibre, and it gives, hence manufacturers find it very difficult to know what they are to do with it, and will not entertain it. It is very similar to a fibre that comes from Spain (Ide and Christie) ;
- (b.) *Keratto fibre*.—Very towy ; not well cleaned, value 16*l.* per ton (Collyer).

On returning to the town some plants of *Furcraea cubensis* were found on land to the westward, and also a patch or two of *Sansevieria guineensis*. Both these are excellent fibre plants. The latter yields fibre that could be used for weaving purposes, and the demand for it would be practically unlimited. Just now these Virgin Islands require nothing so much as a careful examination of their resources, and a clear and definite statement of what is capable of being successfully grown there. The old condition of things cannot be recalled, and if it were not for the great extent of land now being devoted to the growth of fibre plants in all parts of the world, a fibre industry might be strongly urged upon the people of these islands. As it is, there are numerous small industries that might be taken up, and it is hoped that the impetus given to cultural industries by the establishment of Botanical Stations in the Leeward Islands will eventually do much to give a fresh start to more than one industry suited to the circumstances of the Virgin Islands.

We left Road Town before mid-day, and threading our way amongst the intricate passages of the smaller islands, we coasted along the leeward side of the Danish island of St. John, and arrived in the harbour of St. Thomas at 3 o'clock. The Royal Mail steamship "Esk" was lying at anchor there, ready to start on her voyage southward to Barbados at 6 o'clock. The English Consul came on board the "Partridge," and afterwards accompanied us on shore to call upon his Excellency, Colonel Arundrup, the Governor of the Danish West Indies.

At 5 o'clock we took our leave of Commander Noel, with whom we had made a most interesting and successful voyage, and went on board the "Esk" (Captain Powles).

December 17.—We arrived off St. Kitts at 8 a.m., and Nevis at 10.30 a.m. We had a fair passage from these islands to Antigua, where we arrived at 4.30 p.m. Here I took leave of the Governor, his Excellency Sir William Haynes Smith, with whom I had spent 21 very busy and interesting days in the Leeward Islands.

December 18.—I continued my voyage southward again, passing Montserrat and Guadeloupe, and arriving at Dominica at 1.30 p.m. By arrangement with the captain, I was enabled to go ashore and pay a final visit to the Botanical Station, where I was met by Dr. Nicholls and Mr. Green. The fences had been repaired, the traces for the roads and paths had been surveyed, and the water had been laid on. The site is a most suitable one for a station, and it should prove in time one of the most interesting and attractive gardens in the whole of the West Indies.

WINDWARD ISLANDS.

ST. LUCIA.

St. Lucia has an area of 243 square miles, and a population of about 45,000. The surface is very hilly. The main axis of elevation trends from north to south, with numerous ridges and peaks separated by deep valleys. Some of the sharp jagged peaks attain an elevation of 3,000 feet. The scenery depends for its beauty on bolder and more clearly marked features than are found in the other islands. In the Pitons district it is singularly picturesque. The hill sides are generally steep and covered with forest. The valleys are very rich and fertile; the most noted of these are the Mabouya, Roseau, and Cul-de-Sac valleys. Two large districts in the northern and southern portions of the island consist of comparatively level country. There is an abundant supply of moisture from frequent showers, and vegetation seldom suffers from drought. At present only a small extent of land is under systematic cultivation. There are several large sugar factories or usines, the most prosperous at the present time being that at Vieux Fort in the extreme south. Excellent crystallized sugar is produced, as also molasses and rum. Cacao, coffee, ginger, annatto, black pepper, vanilla, grains d'ambrette or vegetable musk (*Hibiscus Abelmoschus*), arrowroot, tous-les-mois (Canna), yams, sweet potatoes, various peas and beans, fruits and vegetables, are grown in small quantities. It is evident that the agricultural development in the interior of St. Lucia has hardly yet begun. There are extensive tracts of splendid land yet untouched, and while some of the valleys could be established with thriving sugar estates, the higher and healthier lands are well adapted for large and successful plantations of coffee and cacao.

The climate of St. Lucia is undeservedly classed as unhealthy. The unhealthiness is entirely confined to a few swampy enclosed valleys, and the danger from venomous snakes (found only in this island amongst the British Lesser Antilles) has been greatly exaggerated. The chief town is Castries, with a population of 6,000, it possesses an excellent harbour and is becoming an important naval and military station. Since a swamp

to the windward of the town has been filled up and the drainage improved. Castries is acquiring a healthy character.

Soufriere, near the Pitons, is the next town in importance to Castries, with a population of about 2,000 souls. It is the centre of an interesting agricultural district, where sugar, cacao, fruit, and spices are grown.

December 19.—I landed at St. Lucia from R.M.S. "Esk" at 6.30 a.m., and visited the Botanical Station. The Curator, Mr. Gray, was laid up at home with an attack of illness. I rode up to Government House on the Morne, and was the guest of His Honour C. C. Knollys, C.M.G., the Administrator. The forenoon was devoted to correspondence for the mail. After lunch I again visited the Botanical Station with the Administrator and the Hon. Charles Chastanet, President of the Agricultural Society. We were met by the Hon. Henry Reeve, Colonial Engineer, who at present has executive charge of the station. We discussed carefully the steps necessary to be taken to lay out the ground and drain it. Also the best arrangements for planting the land with shade trees and economic plants.

December 20.—Correspondence occupied the morning, and I then visited the Botanical Station by appointment with the Curator, who was so far better that he could attend to his duties. The ornamental plants in the garden were well cultivated and in good order. A large central bed was entirely devoted to roses. In the borders on the north and east were numerous plants doing well. A good fence of *Furcræa* divided the garden from the public road on the eastern boundary. The nurseries contained a moderately large stock of economic plants, including such fruit trees as oranges, citrons, limes, and grafted mangoes, purple guava, sweet sop, sour sop, and custard apple, pine-apples and *Flacourtia Ramontchi*, fibre plants such as *Furcræa gigantea*, *F. cubensis*, *Sansevieria guineensis*, *Musa textilis*, *Agave rigida*, var. *sisalana*, and *Boehmeria nivea*. General economic plants such as Arabian and Liberian coffee, annatto, coca, black pepper, vanilla, ginger, cardamoms, arrowroot, cacao, nutmeg, cola, and Nicaragua rubber (*Castilloa elastica*). Besides large and small plants of the above, there were represented about 30 species of palms, about 40 varieties of crotons, and numerous other plants of an ornamental character. The Curator reported that black pepper and vanilla "throve splendidly at St. Lucia." Mr. Gray further added that the particular sort of arrowroot found in St. Lucia, lately tried at Trinidad, is said by Mr. J. H. Hart to have yielded 40 per cent. more fecula than the sort ordinarily grown in that island.

After lunch I accompanied the Administrator to examine the land to the west of the Station. Some negotiations had been undertaken by Government with the view of acquiring this land. The nearest portion to the Botanical Station was a swamp, which, on sanitary grounds alone, ought to be filled up or drained as soon as possible. The other part had a small area of good land in a hollow cultivated with sugar cane. The sides and slopes of this were in grass with a poor, clayey soil. A visit was afterwards paid to a cocoa-nut and cacao plantation belonging to the Hon. Alexander Clavier, Registrar of the Royal Court. This plantation was close to the town of Castries, and in a very promising condition. The cacao, at the time of my visit, appeared to suffer a good deal from the depredations of rats. We rode back to Government House along the Dennery Road, and called to see an excellent kitchen garden with all kinds of English vegetables, belonging to Captain

Hellard, R.E. This was on the Morne at an elevation of about 800 feet.

December 21.—After lunch the Administrator was good enough to ride with me along the main road across the island from Castries to Dennery. This road passes along high narrow ridges, spurs of the central mountain system of the island. It dips under the high peak of Piton Flor, and then gradually descends into the Mabouya valley at the back of Dennery. Its highest point of elevation is about 1,200 feet. For the most part the soil of the district is composed of a stiff, red, tenacious clay. This is very slippery after rain. In the central portion of the island the road passes through a dense forest containing large forest trees, palms, tree ferns, and in wet open places masses of balisier (*Heliconia*). Numerous species of small ferns clothed the banks, as also *Lycopodium cernuum* and *Selaginella flabellata*. There were large expanses of excellent forest land at the head of the Mabouya valley, and cultivation was largely spreading in this direction, which, although on the windward side, was sheltered by the numerous ridges extending from the Piton Flor and Sorcière.

It was evident that in these interior valleys the land is well suited for cultivation. At present there are no roads to reach them. A road projected from the Cul-de-Sac valley into the Mabouya valley, known as the Goldsworthy Trace, would have opened up one of the most fertile portions of the island from coast to coast. This road, unfortunately, was never completed. Cacao is grown in numerous small patches in the Mabouya Valley.

We met parties of peasants carrying half-cured cacao on their heads to Castries, as evidently no other opportunity offered for disposing of their produce. A few coffee bushes still lingered in patches at high elevations, showing that the soil and climate were suitable for the plant, but apparently that other circumstances of capital and labour were not favourable for its extended cultivation. The hot humid valleys of St. Lucia could grow Liberian coffee to almost any extent.

December 22.—This morning I started at 5.30 to accompany Mr. Chastanet on a ride to the northern portion of the island, through Choc and Union Estates to the Marquis section. This part of the country is almost entirely denuded of forest. The lowlands have long been in cultivation under sugar, but the area is becoming more restricted than formerly, and the estates are being turned into pasture. The sugar industry in St. Lucia has become depressed owing to over-speculation just before the low prices of 1884–86. Much money was then lost in connexion with the *usines* as well as on small estates. Under favourable circumstances sugar-growing should be as prosperous in St. Lucia as anywhere in the West Indies. In the meantime there are numerous other industries capable of development, and in the opinion of Mr. Chastanet and others who know St. Lucia well, a system of *Credit Foncier* similar to that in existence at Mauritius would be the means of giving a great impetus to the agricultural development of the island. The vegetation of the northern portions of St. Lucia, where the climate is dry and the soil is comparatively poor, differs greatly from that met with in the central portions. Plants of *Furcraea cubensis*, *Bromelia Pinguin*, and some logwood were noticed along the roadsides, and these, as well as the Gommier (*Bursera gummifera*), the white Cedar (*Tecoma Leucoxydon*), and *Coccoloba uvifera* are sufficiently indicative of a smaller rainfall and a diminished fertility of soil.

We returned to Castries about mid-day.

In the evening, at the request of the members of the Agricultural Society, I gave an address in the Court House. His Honour the Administrator took the chair. A full report of this address was given in the *Voice of St. Lucia* of the 3rd January 1891. Attention was drawn to the aim and object of the Botanical Station and to the desirability of utilising it as a school of practical horticulture for the young men of the Colony. A detailed account was given of the system of cultivation and treatment desirable to give to cacao, coffee, fruits, vegetables, spices, Egyptian cotton, fibres, tobacco, fodder grasses, cocoa-nuts, limes, pimento, logwood, and other subjects likely to be successful at St. Lucia. Attention was drawn to the reports already published respecting the soils of St. Lucia by Mr. Albert Codé; the experimental cultivation of tobacco undertaken at St. Lucia in 1882-1884; the "Forests of St. Lucia," by Mr. E. D. M. Hooper; and the Crown Lands' Regulations passed in Executive Council on the 5th November 1890. In the latter (section xi.) it is stated that "Sales (of Crown lands) by auction shall be for cash, or on such other terms and conditions as may, with the approval of the Governor-in-Council, be specified in the notice of sale.

"In the case of private sales, payment shall be by four equal annual instalments, the first of which shall be one year after the date of the deposit, and the others on the corresponding date in each of the next succeeding years.

"To encourage the cultivation of economic plants, the final payment will be returned to a certain number of purchasers of Crown lands under these regulations, who are able to show good progress in this direction, in the fourth year after the date of the deposit. Plants may be obtained [from the Botanical Station] free of charge."

December 23.—The morning was spent at the Botanical Station. A plan was furnished by the Colonial Engineer, and on this various suggestions were entered for completing the planting up of the land. It was arranged that the plots at the Station should be numbered according to the plan, and that the progress reports should refer particularly to the operations carried on upon each one. The best position for the office, nurseries, and seed sheds was considered to be the land to the south-east, where at one time it was intended to have a lawn tennis ground. This land appeared to me to be unsuitable for that purpose, as it would not be likely to carry a good turf; and besides, if the small area available at this Station for the experimental cultivation of economic plants is taken into consideration, it is not desirable to reduce it still further by devoting a portion of it to a lawn tennis ground. If the additional land adjoining the present Station were acquired by Government, the matter might then very well come under consideration.

As the Christmas holidays were likely to prevent my being able to make many other satisfactory excursions into the interior of St. Lucia, it was arranged, with the approval of the Administrator, that an effort should be made the next day to visit the Soufriere district and send a sloop round to pick me up at Vieux Fort and cross over to St. Vincent. A sloop was kindly engaged for me by Mr. Chastanet, and it left with my baggage at 6 o'clock.

December 24.—I was up this morning at 4.30, and rode down to take the coasting steamer, leaving Castries at 6 o'clock for Soufriere. I arrived at the latter place soon after 8 o'clock. Along the coast there were numerous valleys extending inland, in which there were cultivations of sugar-cane and cocoa-nuts. The ridges, especially in the Canaries

district, were all clothed with forests down to the sea. Mr. Jules Du Boulay kindly assisted me to hire a horse and accompanied me to the Soufriere. Afterwards we visited some cacao cultivation. Mr. Dix, the Resident Magistrate, was at Castries, and I therefore lost the opportunity of meeting him. A good deal of cacao, fruit, spices, and ground provisions is being grown here by peasant proprietors. The soil in some localities is very rich and yields large crops. Mr. Dix is himself a very intelligent and successful planter, and his example is very beneficial in regard to the development of small industries in the district. After parting with Mr. Du Boulay I rode in the direction of Choiseul through small clearings in the hilly parts of the island. The majestic peaks of the Pitons were almost everywhere in view, forming well defined landmarks to the westward. One of my objects in traversing this district was to meet Mr. Eugene Meynier, whose name had been mentioned to me as one of the most successful cultivators in this part of the island. Mr. Meynier was at home, and he received me very kindly. He was the first to export vegetable musk seeds (*Hibiscus Abelmoschus*) from St. Lucia. He received about 10*l.* per bag for it, but the value now is considerably reduced; it sometimes fetches only 3*l.* per bag. There was a small but interesting cacao estate just coming into bearing. An avenue of palms and ornamental plants led to the house, and, what is seldom seen in St. Lucia, clean and well kept pastures for cattle and horses. Mr. Meynier was able to show some excellent black pepper plants in fruit, pine-apples, very heavy bearing orange trees (St. Michael and Tangerine), sapodilla, and excellent vegetables. A few score industrious and intelligent men like Mr. Meynier would be a great boon to St. Lucia, where horticultural methods in regard to the cultivation of plants are almost unknown. Mr. Meynier some time ago was very successful in growing and curing tobacco. At the suggestion of Sir William Robinson, then Governor of the Windward Islands, small grants in aid were offered, and the industry made progress in various parts of the island. The grants were, however, withdrawn before the industry was established, and since 1884 nothing has been done in it. If a Cuban tobacco-grower could be induced to settle at St. Lucia and teach the people how to cure their tobacco, there is every hope that the industry would become permanent. There are excellent soils in St. Lucia, and the climate, especially in the southern districts, would appear to be well suited to produce tobacco of good quality.

I regained the coast road near Mr. Lloyd's sugar estate. After a slight rest here I started for the village of Laborie, and ultimately reached Vieux Fort about 6 o'clock. The sloop "Langelier" arrived about 11 o'clock, and at midnight I embarked for St. Vincent.

A copy of the following report on the St. Lucia Botanical Station, dated 22nd December 1890, was presented to the Administrator:—

The Botanical station at St. Lucia has been established on land reclaimed to the north-east of the town of Castries. It will consist eventually of five and a half acres, but at present only about four acres are in a sufficiently complete state for being planted out. It is distant about half a mile from the landing place at Castries, and easily accessible to the inhabitants.

As the site of the station consisted of a swamp, considerable time has been occupied in filling it up and laying out the land. Apart from the advantages likely to be derived from the Garden itself, the elimination of a dangerous swamp in close proximity to the town of Castries is a public benefit. There is a further small portion of swamp on land adjoining the Botanical Station. This might be acquired and filled up.

If, however, the owner of the swamp, who is also owner of the land between the Darling and Chaussée Roads to the westward, could be induced to sell the whole of it, estimated at 7 acres, for a reasonable sum, it would be well to acquire it. The Botanical Station land would then consist of about $12\frac{1}{2}$ acres, and it would form a very convenient and suitable site for nearly all the operations likely to be undertaken there. A sketch of the Botanical Station land as at present existing and of the land that may be acquired in the future is submitted.

The general plan of the Botanical Station is so far satisfactory. The roads, paths, and drains are suitable for the purpose in view, and should be completed without delay. The drains in every case require to be paved with suitable stone and faced with cement, so as to be easily flushed or swept out. The banks could then be covered with grass and masked with plants of a suitable character. The existence of drains with soft yielding slopes and unpaved water-ways is unsightly and unwholesome, and under the circumstances which obtain here in every way undesirable.

No permanent supply of water is laid on to the ground. Fortunately there is a copious and apparently a regular rainfall, and there has not been, as yet, any serious inconvenience arising from want of water. It would be desirable, however, to have a reserve of water in tanks or cisterns; or to lay pipes connecting with the Castries reservoir as soon as possible.

The Curator lives in a small cottage on a hill close to the station. This arrangement ensures a healthy locality for a residence, and keeps the Curator in touch with his charge.

The buildings necessary for the station should consist of a small office, a seed shed, tool shed, potting shed, and, later on, a small house for a watchman. There is a suitable site for these on what was intended at one time for a lawn tennis ground. The land is too poor for this purpose, and may very well be utilised for offices and sheds. If it is found desirable to lay out a lawn tennis ground at the station, and on this I express no opinion at present, such a ground might be selected near the Darling Road, and away from the ornamental and more cultivated portions of the station.

Before the land newly reclaimed is permanently laid out, nearly every portion of it will require to be covered with a layer, about 12 inches thick, of loamy soil, suitable for the growth of delicate plants. The present soil is suitable as a sub-soil, but it will not fully answer the purpose of a surface soil. Efforts should be made to obtain soil somewhere in the neighbourhood and cart it in before the walks and paths are permanently laid down. Some soil might be obtained from the adjoining land, but more will be required than is likely to be available from this source.

Some complaint has been made that the work of planting permanent trees has not been carried out so expeditiously as could be wished. There are some grounds for this complaint. The Curator should now proceed systematically with the work and furnish a weekly report showing exactly what is being done by him in this respect. The operations requiring immediate attention are as follows:—

- a. Land recently reclaimed should be planted in maize, guinea corn, sweet potatoes, peas, beans, bananas, and other early maturing crops so as to bring it into a suitable condition for regular cultural operations.
- b. Land suitable for the purpose should be marked out and planted with type specimens, properly named, of all the economic plants

obtainable in the island. One or two plants of each would be quite sufficient.

- c. Suitable plots should be selected for the experimental culture of cotton, tobacco, pine-apples, grapes, figs, cacao, spices (black pepper, vanilla, cardamoms, &c., &c.), and any other subjects likely to be suited to the circumstances of St. Lucia.

An important function of the Botanical Station is to teach the people of St. Lucia how to cultivate plants, and obtain the best results from their lands.

The Curator should do all that is possible to teach and train those with whom he comes in contact, and be always ready by precept and example to disseminate good horticultural methods among the people.

There should be some system organised for training intelligent boys at the Botanical Station to fit them for becoming gardeners, and have charge of plantations. The Curator might start with two or three at first, and have them apprenticed for two or three years. The pay should be small, and the boys encouraged to fit themselves for positions of trust where they would assist in the development of local industries.

The Rules for the Protection and Government of the Botanical Station recently adopted appear to be suitable, and are likely to be effective. [See Appendix A.]

ST. VINCENT.

St. Vincent lies about 30 miles southerly of St. Lucia and 100 miles westerly of Barbados. It contains 133 square miles, and a population of about 48,000. The whole island is of volcanic origin. The last eruption of the St. Vincent volcano (now known as the Soufriere) took place as late as 1812. This is situated at the northern extremity of the island, close to Morne à Garou, and rises about 3,000 feet above the level of the sea. A central ridge of mountains extends from north to south, and from this numerous spurs spread on each side, running down to the sea. The mountain slopes are less steep than at St. Lucia, and on the windward side, especially, there are easy gentle slopes well suited for sugar-cane cultivation. At present only about one-sixth of the surface of the island is under permanent cultivation. Large tracts of mountain lands, belonging to the Crown, are capable of growing cacao, coffee, and all kinds of tropical fruits and vegetables. These lands are now in course of being carefully surveyed. The climate of St. Vincent is comparatively cool and healthy. It is well watered by numerous streams, and the soil is fertile. Bequia, one of the group forming the Grenadines, under the Government of St. Vincent, is distant about 9 miles, and thinly populated by fishermen and a few peasants cultivating provision grounds and raising small stock. The chief productions of St. Vincent are sugar, rum, cocoa, arrowroot, spices, a very small quantity of coffee, cassava, honey, beeswax, oils, gums, tanning substances, medicinal plants, fibrous substances, and excellent timbers. St. Vincent very much resembles Dominica in its characteristic vegetation, and, like Dominica also, it possesses wonderful capabilities which have hitherto received little or no attention. The energies of the people have been almost entirely devoted to the production of sugar and arrowroot, and both these industries have of late years become more or less depressed. A good deal of the communication between Kingstown and the outlying islands and districts takes place by boats and small

schooners. These are managed with great skill, and although the sea is often rough, especially in coming from Bequia, accidents are not of frequent occurrence. The internal communication is by roads and bridle paths. The latter will require to be gradually extended to the rich lands in the interior.

December 25.—I arrived in the schooner from St. Lucia at Kingstown, the chief port of St. Vincent, on Christmas morning at 9 o'clock. I was kindly received by His Honour Captain Maling, the Administrator, at Government House. In the course of the afternoon we had a walk through the land set apart for the Botanical Station, which is situated immediately below and adjoining the Government House garden.

December 26.—This morning was spent at the Botanical Station with the Curator. The station occupies a portion of the old Botanical Garden of St. Vincent, established in 1764, but discontinued about 1830. A very interesting account of this garden, illustrated by coloured plates, is given by the Rev. Lansdown Guilding (Glasgow, 1825). This was dedicated to the late Sir W. J. Hooker, the Director of Kew. The St. Vincent Garden was in charge of Dr. Young, who, in 1772, received a gold medal from the Society of Arts "in recognition of the "flourishing state of the garden." Captain Bligh deposited 300 of the bread-fruit plants, brought by him from Tahiti, at St. Vincent, and a little later nutmeg, cinnamon, and cloves were introduced. Some of the mango and cinnamon plants which Lord Rodney took from a French man-of-war in 1792 were also sent to St. Vincent. Dr. Young was succeeded by Mr. Lohead, and, on the death of the latter, Mr. Caley was appointed Superintendent. Soon after this the War Office, under whose control the garden was maintained, discontinued the vote, and issued orders that any plants that could be moved should be sent to Trinidad. Since that time the land has remained in possession of the Government, but little has been done to it except to keep it fenced and gather any crops of nutmegs that might be produced on the trees still remaining there. Most of these trees were uprooted during the hurricane of 1886. The present attempt to revive botanical effort at St. Vincent is due to his Excellency the Honourable Sir Walter Hely-Hutchinson, K.C.M.G. The land has retained its fertility, and numerous interesting trees still remain upon it. The Governor-in-Chief states that "it might be of the greatest use, not merely to the agricultural interests of the island, but for the promotion of the general "interests of tropical agriculture and the extension of botanical knowledge." Mr. Henry Powell (formerly of Kew) was appointed Curator of the Botanical Station in April 1890. At the time of my visit a portion of the land had been cleared, nurseries and seed-sheds had been started, and experimental plots of sisal hemp, cotton, pine-apples, and other plants established. In conjunction with Captain Maling and the Curator a plan was prepared for laying out the land. The direction of the roads and drains and the shelter belts necessary for protecting the Station from north winds was defined. The site proposed for the offices and plant-houses was then examined, as also the position selected for the Curator's house. In all these and kindred matters Captain Maling took a deep personal interest, and I have little doubt the station will make great progress under his superintendence.

December 27.—The morning was spent at the Botanical Station. In the afternoon at 4 o'clock I gave an address at the Court House on the objects sought by the establishment of a Botanical Station, and the

special industries likely to be successfully pursued in the island. The chair was taken by the Administrator. Information was given in regard to the borer (*Chilo (Diatreea) saccharalis*) which had lately attacked the sugar-cane, and suggestions offered for dealing with it. This borer, which is the larva of a small moth, was first noticed at St. Vincent in 1828, and it is now found almost everywhere in the tropics. It has injured sugar-cane at Jamaica (in 1841); at Mauritius (in 1856); at Louisiana (in 1857); at British Guiana (in 1879); and latterly it has been found in Queensland and in various parts of India. The planters of St. Vincent were advised to take prompt measures in dealing with the pest, and if the recommendations then made are fully carried out there is every reason to believe that the injurious effects of the borer can be almost entirely kept in check.

The circumstances of the arrowroot industry were also discussed. This has for a long period been a staple industry of the island. Latterly, however, St. Vincent arrowroot has fallen so low in price that it has hardly paid to export it. At the request of the Governor an inquiry was lately made at Kew into the cause of this. It is probable that in some cases the soil has been exhausted, and in others that the process of manufacture has not been maintained at so high a standard as formerly. Possibly both these circumstances have been at work at one time. In any case, a firm of city merchants to whom Kew applied for information on the subject, expressed the opinion "that during the last few years " there has been a considerable falling off in the quality and appearance " of St. Vincent arrowroots, so much so that they have now reached the " low level of inferior brands. In other words they have lost their " reputation."

This opinion was confirmed by other merchants. It was suggested that systematic effort should be made to bring about a more satisfactory state of things, and that the planters should energetically grapple with the situation and realise that the matter was practically within their own control. A series of St. Vincent soils in which arrowroot had been grown, analysed by Mr. John Hughes, F.I.C., showed that they were " singularly poor in nitrogen, phosphoric acid, and potash; further, " that they were of a very siliceous character, and possessed little " retentive properties." A change of soil or the addition of suitable manures is evidently called for. In the process of manufacture there were numerous improvements capable of being introduced, while the nature and purity of the water and other circumstances also bore directly upon the subject. A fungoid disease attacking the plants had been noticed on one estate, but this is not believed to have had any injurious influence on the general quality of St. Vincent arrowroot.

December 28.—At the invitation of Mr. Duncan MacDonald I left Kingstown for Wallilabo, an estate on the west coast. We travelled by boat, and arrived at our destination about 11 o'clock. After lunch we rode into the interior, visiting small cultivations of cacao and coffee in course of being established by Mr. MacDonald. In good soil and sheltered situation the plants were doing very well. An excellent view was obtained of the interior valleys. The mountain slopes were being extensively cleared for provision grounds by the negroes, but little or no permanent cultivation was seen. In the afternoon Mr. MacDonald was good enough to show me the process of arrowroot manufacture. Nothing could be better done, and I was not surprised to find that his arrowroot was of the best quality. It is evident that if all the planters cultivated highly and paid the same careful attention to the manufacture,

St. Vincent arrowroot would soon regain its position in the markets of the world.

December 29.—I left Wallilabo at 10 o'clock for Chateaubelair. Here I met Mr. Herbert H. Smith, the Collector in Zoology, engaged by Mr. DuCane Godman, F.R.S., in furtherance of the work of the West Indian (Natural History) Exploration Committee. My object was to visit the Richmond valley, a rich tract of country lately explored at the foot of the spurs of Morne à Garou. Mr. Herbert Smith, who knew the valley well and had taken a deep interest in it, was good enough to accompany me and make all the arrangements for the journey. After breakfast we rode through the Golden Grove sugar estate and up the valley leading to the high woods through Petit Bordell. We left the horses near the crest of a ridge, and then made our way along this for some distance until we overlooked a deep valley with Morne à Garon rising in the distance due north. We descended by a steep path to the bottom of this valley, and after following the course of a river for a short distance we struck across the country in a northerly direction until we struck a larger river flowing to the left. We now found ourselves at the bottom of the Richmond valley, and camped for the night at a sheltered spot at an elevation of 1,000 feet close to the river. According to Mr. Herbert Smith the valley extended inland from this point for four or five miles. It had an average breadth of about three to four miles. Altogether it was estimated that there were between 8,000 and 10,000 acres of rich forest in this district, and most of it was suitable for cultivation. The elevation would range from 1,000 feet to 2,500 feet. The land is broken up into numerous valleys and ravines bounded by somewhat sharp rocky ridges. There are numerous streams of excellent water. The soil that came under my observation was of a rich loamy character on a substratum of clay and broken rock. There was very fine timber growing everywhere. We camped under the shelter of fine clean-stemmed Gommier trees, some of which were three to four feet in diameter. In a direct line the distance from the coast would not be more than eight to ten miles. So far no cultivation had been attempted in any part of the valley. The general character of the vegetation indicated a rich soil, plenty of moisture, and sheltered conditions.

December 30.—Leaving Mr. Herbert Smith to continue a journey he had planned across the island I returned to Chateaubelair with a negro guide, following the tortuous and rocky course of the river. This had to be crossed about six times. In leaping from one boulder to another my foot slipped and a heavy stone fell on my toe and crushed it. The rest of the journey was completed with some difficulty. I arrived at a small clearing called King's Pleasure about 10 o'clock, and there was met by Mrs. Herbert Smith and a servant with a pony. After breakfast I left Chateaubelair in a boat for Kingstown, where I arrived at 3.40. Although suffering a good deal with my foot I kept an engagement to give another address at the Court House at 4 o'clock, for which a large number of planters and small negro proprietors had come in from the country. In this address I drew attention to the extensive clearing of rich forest lands that was taking place in the interior of the island merely to grow a few crops of yams and provisions. These lands were exhausted by successive crops, and then abandoned for fresh land. This system was characterised as a most injurious and wasteful one, and demanding the earnest attention not only of the owners of such land, but of all interested in the welfare of the island. Suggestions were made respecting the permanent retention of such lands in a state of fertility, and the plants likely to be successfully cultivated upon them.

The prospects of industries in coffee, cacao, fruit-growing, spices, fibres, tobacco, cocoa-nuts were discussed, and hints given respecting numerous forest products such as timber, gums, and tanning substances capable of being utilised at a small cost.

December 31.—As I was laid up with my foot I discussed with the Curator at Government House various subjects connected with the Botanical Station, and I prepared a short report upon it. A series of papers relating to the survey and sale of Crown lands was received from the Administrator. I was glad to notice that in the Regulations passed in Executive Council on the 4th June 1887 it is stipulated that

“ purchasers [of Crown lands] under these Regulations shall bind themselves to clear and plant the land with such trees, whether cocoa, nutmegs, coffee, &c., or other products as may be approved in each case by the Governor, subject to the under-mentioned conditions; namely—

“ Within two years, one-fourth of the area purchased;

“ Within four years, one-half; and

“ Within six years, three-fourths.

“ If any purchaser under contract fails to pay any part of the purchase money, or if any such purchaser having obtained a grant, fails to observe the conditions for planting the land as above specified, the contract, or grant, in either case, may be rescinded or revoked by the Governor. Notice in the *Government Gazette* shall be conclusive proof of the rescission of any contract.”

Such provisions as these in regard to establishing crown lands in permanent cultivation should, I believe, be gradually extended to every West Indian island, and if the conditions are enforced with due regard to the special circumstances of the land and its capabilities for maintaining permanent crops the cultivators themselves as well as the community generally would greatly profit by them. In supplying seeds and plants for permanent industries the Botanical Stations now established in the islands would be able to give useful assistance. The Curators would also be in a position to afford information and assist the cultivators in deciding upon the selection of subjects best suited to the soil and climate.

In the evening I embarked on board the sloop “Water Witch” for Grenada.

The following is a summary of the Report prepared on the Botanical Station at St. Vincent:—

The Botanical Station at St. Vincent is in course of being established on a portion (about 8 acres) of the old Botanic Garden of the Colony abandoned about 60 years ago. The land lies in a cool, fertile valley below Government House. It is within easy reach of Kingstown, the capital, and about one mile distant from the landing place. Owing to the prevalence of strong winds the area selected for cultivation will require to be well sheltered. Shelter belts of Galba (*Calophyllum Calaba*) have been recommended to be planted across the trend of the valley. Water is required to be laid on to the plant-houses and nurseries. The boundary fences are in good order. The plan of the roads and the system of drains have been carefully worked out. The Curator has already made arrangements for planting out specimen plants of an economic character. Some of these are already doing well. The nurseries are in good working order, and plants are regularly distributed to those desirous of trying new cultures. A house for the Curator is in course of being built on the land. The plan, prepared by Mr. Osment, Colonial Engineer, might very well be adopted as a model

of what is suitable for the residence of a Curator of a Botanical Station in the West Indies. The Botanical Station is under the personal direction of the Administrator. A committee of local gentlemen has been appointed to advise and assist the Administrator, but the functions of this committee are strictly defined, and do not include the control of the action of the Curator. A set of rules has been drawn up for the government and regulation of the station similar to those in force at Grenada and St. Lucia. The present Administrator, Captain Maling, takes a very deep interest in the work of the Station. The Curator, Mr. Powell, is devoted to his duties, and has already created a favourable impression by the energy and zeal with which he has entered upon the work of laying out the garden, and the deep interest he has taken in local industries.

GRENADA.

Grenada is mountainous and very picturesque. It contains 133 square miles (about half the size of Middlesex), and a population of about 50,000. On the leeward side bold headlands, with intervening valleys and ravines, come down to the sea. On the windward side the slopes are easier, with plains extending in a parallel direction north and south. There are numerous springs and streams and two crater lakes, one, the Grand Étang, at an elevation of 1,740 feet, and the other, Lake Antoine, near the north-eastern coast. The conformation of the country is well suited for the purposes of agriculture; there is a regular and copious rainfall, and the soil is fertile. The latter has been formed by the disintegration of volcanic rocks, and varies from a loose friable loam to a reddish strong clay. This latter is found principally in the mountainous parts of the island, and where of a marly character on a substratum of broken rock, it yields large crops of cacao and nutmegs. Grenada is a particularly healthy island. The heat is tempered by regular trade winds, and hurricanes are hardly known. The roads in Grenada have of late years been much improved. In the mountain districts they exist chiefly as bridle paths, but they are for the most part well graded and well drained. A regular coasting service is maintained between St. George and the other ports.

St. George, the capital, has an excellent and well protected harbour and bay. The town is built on a hill projecting into the sea, between the harbour and the bay, and occupies a commanding position. It has much improved of late years, and it is well supplied with water. There are several other towns along the coast, such as Gouave, Sauteurs, and Grenville. The latter is on the windward side, and possesses a good harbour, with, however, a very narrow and difficult entrance.

Carriacou and Caunouan are the largest of the Grenadines under the Government of Grenada. These possess an arid climate and rather poor soil, but at one time, before they were deforested and the soil exhausted, they yielded large crops, both of sugar and other produce.

In the olden days Grenada was a prosperous sugar colony. At present there are very few sugar estates, and the whole character of the cultivation have been changed by the substitution of cacao. The exports of this have reached 55,393 cwts., of the value of 166,178*l*. Spices, such as nutmegs, mace, cloves, and cinnamon are largely grown; the exports of these amounted in 1889 to 1,460 cwts., of the value of 10,220*l*. Cotton and ground-nuts are produced in the Grenadines. The exports of these are:—Cotton, 3,357 cwts., of 6,714*l*.; and ground-nuts, 347 cwts., of the value of 260*l*. Tropical fruits and vegetables are abundant and

cheap. The food resources of the negroes consist of yams, sweet potatoes, kush-kush, pigeon-peas, plantains, Indian corn, cassava, bread fruit.

January 1.—I arrived, in the "Water Witch," off St. George's, Grenada, about 1 o'clock and landed at 2. After a short conference with the Acting-Colonial Secretary (Mr. Drayton), I rode up to Government House and met the Governor-in-Chief. Later in the afternoon we visited the Botanical Garden. I was much pleased with the luxuriant appearance and the growth made by the plants since 1886.

January 2 to January 4.—Under the advice of Dr. Orgias I rested my foot for a few days. In the meantime I was able to discuss numerous subjects of a botanical character relating to the Windward Islands with the Governor-in-Chief. The newly appointed Curator of the Botanical Garden, Mr. George W. Smith, brought up a plan of operations for the coming year. I arranged with him in regard to suitable subjects for the monthly *Bulletin*, and a selection of plants for the trial plots to be established in aid of local industries.

January 5.—Visited the Botanical Garden. Went carefully over the land and sketched the position of drains, paths, and water pipes necessary for a proper working of the establishment. In the afternoon engaged with correspondence.

January 6.—Again visited the Botanical Garden and selected the position of various experimental or trial plots. In the afternoon left with Mr. R. T. Wright, the Chief of Police, for the parish of St. David. Rode along the Windsor Road to St. David's Court House, and then to Hampstead, the residence of Dr. Wells, who had kindly offered to receive me for the night. Dr. Wells has a most interesting estate at a moderate elevation above the sea, with nutmeg, clove, cinnamon, cacao, and other plants well established. The situation was under the shelter of a large hill covered with virgin forest, evidently admirably adapted for growing spices. Some of the nutmeg trees were the oldest and finest in the island. The pimento or allspice of Grenada is evidently *Pimenta acris*, the bay-rum tree, and not *Pimenta officinalis*, the true allspice of Jamaica. The parish of St. David is for the most part occupied by small settlers, who grow a little sugar-cane, some cacao, fruits, and vegetables. The soil is a rich red clay. One or two large sugar estates, the remnants only of the old sugar industry of the island, survive in the alluvial valleys near the sea coast.

January 7.—I left Hampstead about 9 o'clock, and rode through Grand Bacolet (a sugar estate belonging to Mr. Lamothe), and through Tuileries (another sugar estate belonging to Mr. Batt). These are on the windward slopes of the island, facing east. Cacao is grown in the valleys running inland. About 4 o'clock I reached Bellevue (St. Andrew's), a nutmeg and cacao estate belonging to the Hon. H. R. Schooles. This is at an elevation of 1,100 feet. There were here some very large and productive nutmeg trees, from 30 to 40 years old. A number of these trees, covering about 10 acres of land, have been known to yield annual crops of nutmegs of the gross value of about 1,000*l.* sterling. This is doubtless the most valuable plot of cultivated land in the West Indies. The yield is, of course, phenomenal. It has taken about 30 years to bring it about, and the special circumstances of soil, climate, and aspect found here may possibly not be met with anywhere else in

the tropics. Amongst other plants seen here were *Tacsonia sanguinea*, an attractive native passion flower; a fine specimen of *Sabal Blackburniana*; the Spanish nutmeg (*Myristica surinamensis*); and crowning the top of the hill close to the house were two fine plants of the cabbage palm (*Oreodoxa oleracea*), about 130 feet high.

January 8.—In company with Mr. W. R. Elliott, the manager of the estate, I visited the higher valleys above the house, where cacao, nutmegs, and coffee were in course of being planted. The localities for these were rich slopes well sheltered by spurs running down from the central range of mountains. In the afternoon I rode to Grenville, a thriving, busy town on the windward side. Afterwards I went to Boulogne estate, where I was hospitably received by Colonel Duncan, who had lately come out to visit his Grenada estates. Colonel Duncan is an enterprising proprietor, and he has established several cacao and nutmeg estates. His example has stimulated the cultivation of all kinds of spices and other plants in the island. Grenada is destined to become more widely known for its spices than anything else. It produces already more than 1,400 cwts. of nutmegs, mace, and cloves, of the annual value of 10,220*l*. In a few years, when the young trees now growing come into bearing, it is anticipated that the exports of spices will be more than quadrupled.

January 9.—I had the pleasure, in company with Colonel Duncan, of visiting the cacao fields at Boulogne and the excellent cacao house (boucan) for fermenting and curing the produce. A method for drying cacao by means of hot-water pipes, devised by Mr. Messervy, the Director of Public Works, was in course of being fitted to the existing cacao house. This was of so simple a character that it could easily be adapted to cacao houses of any size or character. During the prevalence of wet weather it would be likely to be most effective. A model of this apparatus was shown in working order at the Jamaica Exhibition. As showing the improvement capable of being effected in regard to a single estate by Colonel Duncan, it may be mentioned that during my visit to the Boulogne Estate in 1886 the crop was about 180 bags (30,000 lbs.) of cacao. In 1890, owing to extended planting and improved cultivation, the crop had reached nearly 400 bags (68,000 lbs.) of cacao. Altogether in Grenada there are about 16,000 acres under cultivation in cacao, and the exports in 1889 were 6,203,973 lbs., of the value of 166,178*l*. In 1875 the exports were 3,137,360 lbs., and in 1865 only 1,263,743 lbs. There are several large and well managed estates, such as Plaisance, Tufton Hall, Duggaldstone, Annandale; but Grenada is peculiar in possessing numerous negro proprietors, who cultivate small estates in cacao, and add considerably to the total of the exports. After lunch I left Boulogne, and rode through Mount Horne, Force, Columbia, Balthazar, and Chantilly to Colonel Duncan's nutmeg estate at Belvidere, where I met the Hon. F. Gurney, the manager, and spent a most interesting afternoon. This estate, situated in a depression in the centre of the island, will eventually contain about 250 to 300 acres of nutmeg trees, all of which are in an excellent state of cultivation and a large number bearing heavy crops. Nowhere else in the New World has the nutmeg tree found so congenial a home. In the evening we reached Mount Felix, on the leeward slope, a cacao estate, where nutmeg trees are also growing most luxuriantly. A large tree of *Cinchona succirubra*, the red bark cinchona, about 35 feet high, was growing just below the house. This and some others were received from me while in charge of the Jamaica Botanical Gardens in 1884.

January 10.—The morning was spent in making observations and collecting specimens of the Cacao beetle, determined by Mr. R. McLachlan, F.R.S., as *Steirastoma depressa*, L. This is a longicorn beetle which has been doing some harm on Grenada estates. It bores while in the grub state into the cacao trees, just below the bark, and when the burrow extends all round a stem or branch the trees are permanently injured. The beetle has probably been introduced from South America. It is a well known enemy of cacao trees in Surinam, and specimens were shown in the Surinam Court at the Jamaica Exhibition. I found both male and female beetles at Mount Felix on cacao trees. The females were busy laying their eggs.

Some Liberian coffee trees were in a very thriving condition, but in some cases they had been cut down to make room for nutmeg trees. Several plants of vanilla were growing on tall trees, and there were numerous clumps of Malabar and Ceylon cardamoms and Melegueta pepper. Besides these were some trees of Ceara rubber, tonquin bean, Arabian coffee, cloves, and cola nut. To quote the words of the manager, "the soil and climate of Grenada will grow everything," and to judge by the number of valuable plants flourishing at Mount Felix this would appear to be almost true. After a long day in this interesting portion of Grenada I had the pleasure of returning with Mr. Wright through Belvidere Estate, and after passing over the Grand Étang we took the main road to St. George's through Constantine, Snug Corner, and Tempé Valley. I arrived at Government House at 6.30 p.m.

January 12.—I gave an address in the Court House at 11 o'clock. The Governor-in-Chief, the Hon. Sir Walter Hely-Hutchinson, K.C.M.G., took the chair. A full report of this address was given in the *Grenada Chronicle* of January 17, 1891. The aims and objects of the Botanical Garden were first discussed, and a sketch given of the improvements likely to arise by its co-operation in fostering local industries. Attention was directed to the desirability of extending knowledge in regard to horticultural methods, and to training young men as gardeners and to take part in extending minor industries. In spite of the flourishing state of the cacao and spice industries in Grenada there were still nearly 57,000 acres of uncultivated land in the island. After allowing a suitable amount to be permanently kept in forest on the central ridges, at least 15,000 to 20,000 acres of land already cleared remained to be made productive. Plants for such lands were suggested and hints given for their successful treatment. The following industries were then briefly reviewed:—Sugar, cacao, nutmegs, cloves, cinnamon, vanilla, black pepper, cardamoms, oranges, bananas, pine-apples, grapes, mangoes, Arabian coffee, Liberian coffee, fibres, tobacco, cocoa-nuts, silk, cotton, and Gambier. An account was given of some of the insect and fungoid pests affecting cultivated plants in the island and directions given for dealing with them. By means of a large drawing of the cacao beetle kindly prepared by Lady Hely-Hutchinson and various specimens placed before the meeting, the life-history of this enemy of the cacao trees was sketched. It was pointed out that it was very easy to capture the beetles in the early morning, and if children were regularly and systematically employed to do this during one or two seasons there would soon be an end to them.

January 13 to January 15.—A visit was paid to the interior forests in the neighbourhood of the Grand Étang with Mr. R. V. Sherring, F.L.S., employed by the West India (Natural History) Exploration Committee to make collections of the flowering and cryptogamic plants

of Grenada. Within a radius of two miles of the Rest House about 60 species of ferns were observed, and numerous small flowered orchids some of which were probably undescribed. Numerous palms were found crowning the ridges, and exceptionally fine mountain gommier or incense trees (*Dacryodes hexandra*). The results of the Botanical collections made in this and the other islands will be published from time to time. Already very valuable additional information has been obtained of the distribution of certain species, and many new ones have been described.

January 16.—I paid a final visit to the Botanical Garden this morning; and I had an opportunity of discussing the conclusions embodied in my official report with Mr. J. H. Hart, F.L.S., Superintendent of the Botanical Gardens at Trinidad. Mr. Hart supervises the Botanical Institutions in the Windward Islands, and he had come to Grenada to meet me. I was glad to find that a good foreman could be recommended by him for service under Mr. Smith. At 9 o'clock I embarked on board the R.M.S. Eden (Captain Smith) for Barbados and Jamaica. The Governor-in-Chief was also on board going on an official visit to St. Vincent. The following is my report on the Grenada Botanical Garden :—

This garden was started in 1886. It is situated about a mile due west of the town of St. George by road; but it may be reached by water from the wharf by a much shorter distance.

The site was selected on account of its proximity to the town, the richness of the soil, and shelter from prevailing winds. The land is bounded to the north by a somewhat steep slope of about 500 feet, at the top of which is Richmond Hill. The garden, in fact, occupies a hollow sheltered slope at the foot of this hill and faces the harbour (carenage). The site is in every respect well suited for the purpose of a Botanical Garden; and the rapid growth made during the last three or four years by the palms and trees in it fully bears out this view. The only serious drawbacks to the site as pointed out by me to the Garden Committee in 1886 were (1) the probable wash that would arise from water coming down the slopes; and (2) the absence of a permanent water supply. To remedy the first defect, I strongly urged that a large well-paved drain be constructed horizontally above the garden boundary to carry off all the water coming down from the Richmond Hill. I then recommended also that a series of contour-drains be made on the land itself, and that these be connected with three walled and paved drains passing down at the side of or through the garden grounds. Under a system of drains here indicated, constructed under the supervision of a surveyor and engineer, the garden land would have been efficiently drained, and no water whatever would have interfered with the garden paths or caused wash in any portion of it. Owing to various circumstances, which I need not discuss here, the arrangements for draining the land were never fully carried out. In consequence, considerable injury has been caused to the garden paths and beds, and the work so long delayed now remains to be dealt with in an efficient manner. I am glad to find that a vote of 120*l.* appears on this year's Estimates for this purpose. It is probable that a larger sum will be necessary to complete the whole work; but the amount already voted will go far to construct the most urgent of the drains required. It is hoped that provision will be made in next year's Estimates to complete the work. The supply of water to the garden is now in course of being laid down. The want of a continuous supply of water during the first three years' operations at the garden has been severely felt. In fact, I

attribute to this the backward state of many of the operations connected with the garden work, as for some time the greater part of the small sum allowed for the establishment had to be expended in carrying water by hand to keep the plants alive. To render the present water supply more efficient it is necessary to furnish each stand-pipe, or many of them, with a small cement or iron tank into which the water-cans could easily be dipped and filled.

I may, however, mention that, in spite of the drawbacks which have hampered the proper establishment of this garden during the last five years, its present condition is by no means unsatisfactory. The original laying-out and planning of the garden devolved upon Mr. W. R. Elliott, who was first Curator, from March 1886 to 1889.

I must bear testimony to the good work done by this officer, often under disadvantageous and discouraging circumstances; and the only permanent features of the garden of a satisfactory character which now remain are clearly traceable to Mr. Elliott's efforts. Some of the walks are rather steep, and a few beds and banks will require to be re-laid and re-made, but taking into account the rough nature of the land when taken over by Mr. Elliott in 1886, and the difficulties he had to contend with, I am of opinion that he took a judicious and practical view of the situation, and the main features of the garden as first laid out by him should be adopted in any future operations.

As regards cultural details and recommendations of a purely routine character, the reports prepared by Mr. Hart fully meet the circumstances of the case. The supervision exercised by Mr. Hart over this and the other Botanical establishments in the Windward group is calculated to render them more efficient than they would otherwise be, and I recommend that, in addition to Mr. Hart's annual visits, the Curators might be allowed to go to Trinidad from time to time in order to study the operations carried on there, and make a selection of seeds and plants for their several gardens.

Amongst the special matters now requiring attention at the Grenada Garden, are the erection of a seed shed for raising plants from seed, and the re-arrangement of the nursery beds. The present very unsightly potting shed may be converted into a tool-shed, potting shed, and a store-room for cases. The entrance to it should be masked by an arbour covered with creepers. The present office should have a rockery on the upper side of it, containing a selection of succulent plants, and the surroundings below and on the sides should be made as ornamental and as attractive as possible.

Mr. Hart has already dealt with the treatment of the footpaths. I would add that the drains crossing the footpaths should have earthenware or concrete pipes, and in no case should an open drain be allowed on the main footpaths. Further, a contour-drain should be constructed on the slopes about 4 feet above every horizontal footpath, and the slopes above and below the footpaths should be covered with grass, and meet the path (or drain if there be one) without any intervening space of broken soil. Some of the slopes constructed by Mr. Elliott are of this character. The system should be extended throughout the garden.

The plants already established in the garden are growing well, and they will soon give the place an attractive appearance. Many of the plants are common sorts, and scarcely ornamental enough for a Botanic Garden. This is a defect that can be gradually remedied. The collection of economic plants is somewhat small and should be increased. Scarcely any experimental work has, so far, been undertaken. Trial plots might be established, as soon as circumstances permit, with such plants as Egyptian cotton, tobacco, vanilla, cubebs, black pepper, Gambier,

cloves, nutmegs, pine-apples, vines, and any others likely to be of use or interest to the island. It is not desirable to have numerous plots in operation at one time. The work should be distributed so as not to encroach too heavily on the garden vote, and at the same time be confined to subjects of practical interest to planters and others. This industrial side of the Botanic Garden work should not be lost sight of. It is one of the most important functions which the garden is intended to discharge, and if judiciously carried out, with suitable information published from time to time in the monthly *Bulletin*, it cannot fail to be widely and duly appreciated.

In addition to the collections of ornamental and economic plants the Curator should make a special effort to introduce into it as many native plants as possible for the instruction of visitors. The ferns of Grenada, for instance, are very interesting, and owing to the researches in course of being carried out under the auspices of the West India (Natural History) Exploration Committee, they are known to be very numerous and characteristic. The Curator might at once commence a fernery in a suitable spot, and all the native and other ferns should be correctly and distinctly labelled. The same course might be adopted with regard to the native orchids, the native medicinal plants, the most remarkable timber trees, and, indeed, of all noteworthy plants native of the island. Of the latter plants one or two specimens only would be necessary or desirable. At present the garden possesses few or no native plants. As these are often found in remote and inaccessible places, entirely beyond the reach of most of the inhabitants, it is impossible for them to be observed and studied unless they are cultivated in some central spot like the Botanical Garden. The Curator should receive permission to visit different parts of the island for the purpose of making collections as well as to meet planters and study the circumstances of local industries. I find that the number of people who visit the Grenada Garden at present is very small. Apparently the people have failed to be interested in the work of the garden, and the suggestions here made will, I believe, go far to remedy this defect.

As already stated, this garden was under the care of Mr. Elliott from 1886 to 1889. After his retirement it was temporarily placed under the control of a sub-foreman from the Trinidad Botanic Gardens. In 1890 Mr. Charles Murray, formerly of the Edinburgh Botanic Gardens, appointed Curator of the Botanic Station at Dominica, was transferred to Grenada. Mr. Murray proved unsuitable for the post, and he resigned the appointment in November last. The present Curator, Mr. G. W. Smith, has been appointed by the Governor on probation for six months. Mr. Smith has not received a regular training as a gardener, and in this respect he is placed at a disadvantage in regard to the more technical duties of the post. I have had numerous opportunities of meeting Mr. Smith at the Botanic Garden during the last fortnight, and have spent several hours with him discussing the details of garden work. I am of opinion that, as Mr. Smith is so thoroughly interested in his work, possesses a good knowledge of plants, and has made so good a reputation as a botanical collector in St. Vincent, he may prove an efficient Curator of the Grenada Garden. He is active and energetic, and evidently thoroughly accustomed to bear fatigue in a tropical climate. Under the circumstances of the case I recommend that Mr. Smith may be allowed to remain in charge of the garden. It is essential, however, that an efficient foreman, trained at the Jamaica or Trinidad establishment, be engaged to carry on the nursery and planting work and assist the Curator in training young lads as gardeners. It is unnecessary to explain more fully the desirability of training young lads

at these Botanical Stations. The subject has already been dealt with in the reports on other Stations.

It would be of considerable advantage to Mr. Smith if he could at an early date spend some time at the Trinidad Botanic Gardens, and obtain a thorough insight into the details of the work of the propagating sheds and the nurseries at that establishment.

If the recommendations contained in this report are fully carried out, I have every hope that the Grenada Garden will enter upon a more successful career than heretofore, and that it will prove of lasting benefit to the community. The present Governor-in-Chief takes a deep personal interest in the Institution, and that in itself is an important element in regard to securing greater efficiency in administration and in attracting public attention to the work carried on in connexion with it.

TRINIDAD.

It was intended that I should pay a visit to Trinidad during my mission, and I had made arrangements to do so. I had also received a very kind invitation from His Excellency Sir William Robinson, K.C.M.G., whose energetic efforts in behalf of cultural industries in the West Indies have produced such good results. I had looked forward with great interest to renew my acquaintance with the splendid island in which Sir William Robinson had lately developed many new industries, and to observe the progress made in regard to the staple industries of sugar and cacao. A very successful and interesting industrial exhibition had just been held at Port of Spain, and I had also been asked to meet the members of the Central Agricultural Board.

Owing, however, to the time lost while I was laid up at Grenada, and the absence of a convenient means for crossing over to Trinidad between the mails, I was compelled, much to my regret, to give up my intention to visit the island. One of the objects I had in view in going to Trinidad was to confer with Mr. Hart in regard to the supervision of the Botanical Stations in the Windward Islands. I was, however, able to carry out this part of the arrangement by the courtesy of Sir William Robinson, who kindly allowed Mr. Hart to meet me at Grenada.

BARBADOS.

On the voyage north the "Eden" touched at St. Vincent about 5 o'clock. The Administrator, Captain Maling, came on board to receive the Governor-in-Chief, and he brought with him six Caribs, who were going to show their special method of making baskets at the industrial village in connexion with the Jamaica Exhibition. I undertook to look after the men during the voyage. In taking leave of Sir Walter Hely-Hutchinson at St. Vincent, I expressed to him my warm thanks for the personal kindness and the hospitality I had received from him at Grenada. It was with sincere pleasure I had discussed with him the numerous and enlightened measures he has in hand for the development of the resources of the Windward Islands.

January 17.—I arrived at Barbados at 6 a.m., and in accordance with an arrangement previously made with Mr. J. R. Bovell, Superintendent of the Botanical Station at Dodd, I visited that institution. The station is attached to the boys' reformatory school, and the labour of the boys is utilised to cultivate about 90 acres of land chiefly in sugar-canes. The idea of establishing a Botanical Station here is due to Sir William Robinson when he was Governor of the Windward Islands in 1886. Numerous varieties of canes were obtained from Jamaica and elsewhere, and in conjunction with Professor Harrison, Mr. Bovell, the Superintendent, undertook and carried out a very valuable series of cultural experiments to determine the best varieties of canes suitable for the circumstances of Barbados. After this the scope of the experiments was enlarged, and the effect of artificial and other manures on the growth and yield of canes was carefully followed. The results of these investigations were published in annual reports prepared by Professor Harrison and Mr. Bovell. In 1887–88 there were noticed in the cane fields at Dodd grass-like growths which were supposed to be seedling sugar-canes. The first information respecting this discovery (or rather rediscovery, for similar growths had been noticed before at Barbados) was published in the *Kew Bulletin* for December 1888. Both botanists and sugar planters had hitherto sought in vain for seeds of the cultivated varieties of sugar-cane. The subject was closely followed in subsequent years, and the fact was ultimately established that under certain conditions some varieties of sugar-canes still retain the power of producing fertile seed. A description of the flower and fruit of the sugar-cane, with plate, is given in the *Journal* of Linnean Society, vol. xxviii. (Botany), p. 197, pl. 33. Observations on the same subject, which proved afterwards to be earlier than those made at Barbados, as regards a description and drawings of the seed, were published by Dr. Benecke at Java in 1889.

The observations and investigations carried on at the Barbados Botanical Station are generally acknowledged to be of the highest value to the staple industry of the island. The facts so far obtained show that a good deal more is possible to be done to improve the yield of canes; and in spite of the great importance of the sugar industry to the West Indian Islands, it is surprising that no systematic efforts have hitherto been made to establish experimental stations properly equipped for the special purpose of doing for the sugar-cane what has been so successfully accomplished in European countries in regard to the beet. It is true that something has been done in this direction on private estates at Trinidad and Demerara, but what is evidently required now is an experimental station devoted to scientific agricultural research controlled by competent men, and acting as the training school for the planters of the future.

Besides the experiments in sugar-cane an effort has been made at the Dodd Botanical Station to cultivate other plants, especially species of *Agave*, *Furcraea*, *Sansevieria*, *Boehmeria* for fibre purposes. The land is, however, of too clayey a character for such plants, and also too much exposed to strong and dry winds. While it has answered very well up to a certain point for useful experiments in regard to sugar-cane, the land at Dodd is quite unsuitable for the cultivation of other plants. The wind is most injurious to them, and during certain seasons of the year there is little or no water available for purposes of cultivation. It would be of considerable advantage in the interests of the sugar industry, as well as of others, to possess an experimental station in another part of the island. A petition of the Barbados Agricultural Society and Reid School of Practical Chemistry

has been presented to the Governor, asking "that a Bill be sent down to the Legislature appropriating a sum of money for the purpose of establishing on the highlands in the 'ratooning' district of the island a second botanical and experimental station similar to that already existing at Dodd." If such a second station were established, it is possible that land might be found well suited for the cultivation of many other plants likely to prove of great value to Barbados. The island is now so entirely dependent on sugar, that it is very desirable to encourage as far as possible any measure calculated to improve and establish it. It is also equally important to support it by other and subsidiary industries. There are several thousand acres of waste land in Barbados where a fibre industry might be successfully established, and there are also other lands where plants yielding tanning barks might be cultivated. None of these can be experimentally tried under favourable circumstances at Dodd owing to the unsuitability of the soil and the exposed character of the locality.

January 19.—A very interesting day was spent visiting estates on the western side of Barbados. In the evening I embarked on board the R.M.S. "Medway" for Jamaica.

JAMAICA.

A good deal of interest is attached to Jamaica just now. After a very long period of stagnation it is believed that it has eventually entered upon a condition of comparative prosperity. It has a large surplus revenue, the land is fast increasing in value, and the people have developed numerous resources which a few years ago were little thought of. The fruit industry of Jamaica (chiefly in bananas and oranges) is probably now the most important of any in the tropics. In 1875 this was of the estimated value of 15,000*l.*; in 1884 it had increased to 274,000*l.*; while in 1889 it had reached the total value of 324,000*l.* During 1889 the value of the sugar exported was 244,000*l.*, and of the rum 137,000*l.* The fruit industry is now, therefore, the most important industry in the island, and its expansion is all the more gratifying that it stimulates the cultivation of a number of plants that will be the means of extending large and permanent industries. As a case in point, it may be mentioned that cacao plants can be easily and successfully grown under the shade of bananas, and when the bananas have ceased to bear, the cacao trees will remain in the land and yield regular crops for 40 or 50 years. Before the extension of fruit growing, Jamaica exported little or no cacao. In 1875 the exports were of the value of 873*l.*; in 1883 they had increased to 5,000*l.*; while in 1889 the total value was 11,000*l.* Another large development has taken place in regard to logwood. The value of the logwood exported in recent years has been as low as 106,000*l.* In 1889 this had reached a total of 379,759*l.* This general improvement in the condition of Jamaica has been brought about by the energetic and statesmanlike policy adopted for the last 25 years by Governors like Sir John Peter Grant and Sir Anthony Musgrave. The means of communication by roads and railways have been extended, an efficient telegraph system has been established, and rapid steamship services have been encouraged between the island and the principal ports of the United States and Canada. Perhaps the best proof of the reality of the "New Jamaica" is shown by the energy and success with which the island has lately carried through the arrangements for an

Industrial Exhibition which was opened amidst the greatest enthusiasm and in the presence of a large and brilliant assembly by H.R.H. Prince George of Wales on the 27th January. A few years ago such an exhibition in Jamaica would have been impossible. Its success as an exhibition is felt to be largely due to the personal influence and the capable energy of the present Governor, Sir Henry Blake. He has fully realised the value of fostering every industry calculated to add to the welfare of the people; and, although financially the exhibition will not be so successful as it deserves, it will mark an altogether new epoch in the history of the island.

It is possible here to give only a brief description of the Jamaica Exhibition. The building, about 500 feet long, is designed in a Moorish style of architecture, with a large central court surmounted by a lofty dome and cupola. The large and spacious aisles, fitted with galleries, extend east and west from the dome, and the whole building is very tastefully and effectively decorated. It stands, with dome, transepts, and minarets, in a commanding situation at the head of the racecourse, on a gentle slope overlooking the town and harbour of Kingston. It is surrounded by about 50 acres of ground laid out in ornamental gardens. Both the building and the grounds are lighted throughout with electricity. In addition to the main building there are numerous annexes, including a theatre, a fine-arts gallery, and industrial village, a vivarium, an apiary, a working dairy, and models of various buildings and machinery suggested for use in the prosecution of tropical industries. Every portion of the interior of the Exhibition is attractive and full of interest. The products of Jamaica occupy considerable areas, situated east and west of the dome. They are not so effectively shown as could be wished, but there can be no doubt that an island that can display so varied and so valuable a contribution of the vegetable productions of the tropics must eventually become most prosperous and thriving. Canada has made a great show of her manufactures and agricultural products. Several European countries, such as Austria-Hungary, France, Germany, and Italy, have sent important and valuable contributions. The Mother country is represented in several very striking collections. Her Majesty the Queen has graciously lent portraits of Herself and H.R.H. The Prince Consort, from Windsor Castle. These are placed on each side of the large dome. Nearly one hundred different English firms have exhibits in the main building and in the several annexes. The Exhibition was largely assisted in the United Kingdom by a Committee appointed in London, of which the Right Hon. Lord Knutsford, the Secretary of State for the Colonies, was honorary president, and Mr. Charles Washington Eves, C.M.G., was chairman. Further, the Imperial Parliament made a grant of 1,000*l.* towards the general funds of the Exhibition. The British West Indian Colonies represented at the Exhibition consist of the Bahamas, Barbados, and the Windward Islands, including St. Lucia, St. Vincent, and Grenada. A short account of the exhibits from the Windward Islands is given in Appendix B. Both the Turks Islands and the Cayman Islands, dependencies of Jamaica, have excellent exhibits. The Barbados Court was one of the most attractive of any, and this mother-colony of the West Indies deserves great credit for the enterprising manner in which it has supported the Jamaica Exhibition. The Bahamas Court was also very tastefully arranged, and, as was natural, it contained splendid specimens of the "pita" fibre (Sisal Hemp), which just now is attracting so much attention. The Exhibition will undoubtedly prove of great educational value to the people of Jamaica, and it will so greatly enlarge their views of the value of their resources that whatever money may be required to cover the general expenses of the undertaking, it

cannot fail in time to advance the social and material interests of the Colony. In the arrangement of the ornamental grounds surrounding the Exhibition, in decorating the building and in making a complete collection of the plant productions of the island, the Botanical Department has afforded valuable assistance. By means of transplanting machines, supplied through Kew, the grounds have been established within about 12 months with handsome collections of large palms and ornamental trees, clumps of bamboos, tree ferns, and various economic plants, all of which have proved of great interest and beauty.

The Botanical Gardens of Jamaica have a very interesting history. So far back as the end of the last century there were three important gardens in the island containing valuable plants from nearly every part of the world. The old Botanic Garden of the Colony was at Bath, in the eastern part of the island, about 40 miles from Kingston. To this garden Dr. Thomas Clarke was appointed superintendent in 1774. It contained chiefly tropical plants, and here some of the first bread fruit trees and the first mango trees were grown in the island. A private garden of great interest had already been established near Gordon Town, about 9 miles from Kingston, by Mr. Hinton East. A catalogue of the plants was prepared by Dr. Broughton, and published as an appendix to Bryan Edwards' *History of the British West Indies*, vol. 1, p. 475. At the death of the founder this garden was purchased by the Government, and Mr. James Wiles, a gardener who had assisted Captain Bligh in bringing bread fruit, sugar-cane, and other plants from the South Seas, was placed in charge of it. In 1782 there were in Mr. East's garden the mango, akee, cinnamon, camphor, jack-tree, bichy or cola nut, date palm, rose apple, litchi, turmeric, and many valuable tropical and sub-tropical plants, numbering in all about 600. A third garden had been established some time before 1793, on the slopes of St. Catherine's Peak, at an elevation of 4,300 ft., by Mr. Matthew Wallen, a friend of the great botanist Olavus Swartz. This was for plants of temperate regions. To this garden the Blue Mountain districts of Jamaica are probably indebted for many European plants now found naturalised there. The English oak, common myrtle, white clover, sweet violet, black-berried elder, buttercups, strawberries, wild pansy, groundsel, dandelion, are all no doubt plants that once flourished in Mr. Wallen's garden.

It will be noticed, therefore, that more than 100 years ago Jamaica possessed excellent Botanical Gardens.

Further, in order to utilise those under the control of the Government "separate committees were appointed for each county to receive and "distribute the plants allotted to them by which "means the public has derived all the advantages to be expected from "these establishments." (*Journals*, House of Assembly, 1791-1807.) The present Botanical Gardens of Jamaica have fully sustained the excellent record of the past. They were reorganised at the instance of Sir Anthony Musgrave as a separate department in 1879, and the present writer was in charge of them until 1886.

They have now as Director, Mr. William Fawcett, B.Sc., F.L.S., assisted by four European superintendents. A sketch of the various establishments is as follows :—

1. *The Botanic Gardens, Castleton*.—Elevation, 580 ft.; mean temp., 76° F.; annual rainfall, 108 inches. Extent about 10 acres. Situated in the parish of St. Mary's, 19 miles from Kingston. The chief features are an excellent palmetum, a collection of economic, spice and fruit trees, a fine collection of orchids, an experimental ground for new industrial plants, and large nurseries containing about 40,000 plants.

2. *The Hill Garden and Cinchona Plantations*.—Elevation, 4,500 ft. to 6,300 ft.; mean temp. at 4,500 ft., 63° F.; average rainfall, 121 inches. On the slopes of the Blue Mountains, 24 miles from Kingston. Plants of sub-tropical and temperate regions are here cultivated. The cinchona plantations cover about 140 acres. The nurseries contain large numbers of plants of timber and shade trees for reforesting purposes, as well as plants suited for cultivation in the higher mountains.

3. *The Hope Garden*. — Elevation, 650 ft.; mean temp., 77° F.; average rainfall, 50 inches. Extent, 220 acres. Situated five miles from Kingston, at the foot of the Liguanea Hills. This garden is destined to become the chief botanical establishment in the island. It is being laid out with great care and judgment. Carriage drives, with ornamental borders, of a total length of more than two miles, have been already made, and a large number of very interesting plants established.

4. *King's House Gardens and Grounds*.—Elevation, 330 ft.; mean temp., 78° F.; average rainfall, 49 inches. Extent, 177 acres. About 20 acres are kept up as an ornamental garden attached to the official residence of the Governor. Many ornamental palms, orchids, ferns, and other plants are cultivated, and very attractive borders have lately been made on each side of the carriage drives.

5. *Kingston Parade Garden*.—Elevation, 50 ft.; mean temp., 80° F.; average rainfall, 35 inches. Extent, 5 acres. This is a public pleasure garden for the town of Kingston, with ornamental trees, flowering plants, tanks for aquatic plants, and fountains. This is also utilised as a dépôt for economic plants, and the headquarters of the Department in Kingston.

The old Botanic Garden at Bath has been much reduced in size, and, owing to its remote position, it is of little value or importance. It is, however, maintained as a station, and possibly in the future it may serve as a dépôt for plants for distribution in the rich and fertile districts in the eastern portion of the island.

The Palisadoes Cocoa-nut Plantation was established by the Botanical Department on the long strip of sandy land enclosing Kingston Harbour. About 23,000 cocoa-nut trees are now coming into bearing. Having accomplished its special purpose as an experimental plantation, the Palisadoes is now leased by the Government at an annual rental.

The important part taken by the Botanical Gardens, Jamaica, in developing local industries is fully recognised. Their history is almost unique in this respect amongst the botanical institutions of the Colonies. They have contributed largely also to increase botanical knowledge in regard to the flora of the West Indies, and taken a leading part in disseminating sound and practical information respecting the cultivation of all plants suitable for this part of the world. A few years ago, in the whole of the West Indies, there were only two botanical institutions. Now there are eleven. This development is one of the strongest proofs that the islands are recognising the value of systematic organisation of a botanical character for increasing their natural resources, and it affords great encouragement as regards the future.

Before leaving Jamaica I was invited to give the opening lecture in the hall of the Exhibition building on February 9th. The arrangements for the lecture were made by the members of the Horticultural Society, and the President, the Honourable Dr. Phillippo, took the chair. At the request of His Excellency the Governor, who was also present, I treated of subjects of special interest to the island at the present time. These briefly stated referred to the better cultivation of fruits, the larger cultivation of choice early vegetables for northern markets, the systematic cultivation of limes, the most favourable openings for a fibre

industry, the improved curing of cacao, and experiments in the cultivation of spices, cola, and gambier.

I left Jamaica for Barbados on board the R.M.S. "Medway" on February 10th.

BARBADOS.

February 10th to February 14th.—The impression carried away from Jamaica was of a thoroughly favourable character. Contrasted with the condition of Jamaica, when I first knew it, in 1879, nothing could have been more changed for the better. If the other British Possessions in the West Indies, such as the Windward and Leeward Islands, could enter upon a similar condition of natural prosperity based on the development of numerous industries suited to the soil and climate, there would be practically an end to the depression which has affected them for so many years. It is to be hoped that what has been done in Jamaica will encourage the smaller islands. They should not, however, merely copy the Jamaica industries, because they happen at the time to be remunerative. This is a weak point in most of our tropical possessions. There are hundreds of small industries suited to the West India Islands where there would be little danger of crowding the markets. Each island possesses its special circumstances, and if these are intelligently and carefully studied there ought to be little difficulty in selecting such industries as shall prove permanently remunerative.

While at Jamaica I received the following letter from Barbados:—

The COLONIAL SECRETARY, Barbados, to MR. MORRIS.

Colonial Secretary's Office, Barbados,

January 23, 1891.

DEAR SIR,

It has been represented to the Governor by the leading members of the Agricultural and Horticultural Societies in this island, that before your departure from the West Indies it might be possible for you to deliver a lecture here on the subject of the cultivation of economic plants suited to West Indian requirements, or on some such similar subject of public interest. I am therefore directed by his Excellency to communicate to you that such a lecture from you would be highly appreciated by the community of Barbados, and that you will confer an obligation on the Colony and on the Government if you can make it convenient to deliver one.

A brief reply by telegram will greatly assist us in making timely arrangements in case such should be necessary.

Yours, &c.

(Signed) C. A. KING-HARMAN.

D. Morris, Esq., M.A., F.L.S.

I consented to give the lecture on the 14th February, the day the "Medway" was expected to touch at Barbados. We duly arrived at 6 a.m. on the morning of the 14th, and I went ashore early, as I was anxious to observe the method adopted for the preparation of Barbados aloes. This old industry still survives in one remote corner of the island, and with the kind assistance of Mr. J. R. Bovell I was able to arrange to drive out to Dodd, and from thence to the College estate,

where we were met by Mr. Hollingsed, the manager. After a ride of about three miles past Codrington College we arrived at the College Savannah where the aloe plants (*Aloe vulgaris*, L.) were grown. In the fields were a number of wooden troughs, in which the leaves, after being cut, were placed to drain. The crude juice was carried into a boiling house close by, placed in a large cauldron, and boiled for several hours until it was concentrated into a thick viscid mass. During the boiling process the juice is well stirred by a wooden paddle, and as it thickens it is regularly tested until it has attained the degree of consistency required. It is then placed in gourds, and when hardened sufficiently to bear transport it is ready for market. A more detailed description of the cultivation and manufacture of Barbados aloes will probably be given in a later number of the *Kew Bulletin*.

I returned to Bridgetown about 2 o'clock. I gave my promised lecture in the Council Chamber. The chair was taken by the Governor, his Excellency Sir Walter Sendall, K.C.M.G. The following is an extract from an article in the *Agricultural Gazette*, the official publication of the Barbados Agricultural Society:—

"The community at large is very much indebted to Mr. Morris for the very conclusive and effective lecture which he delivered on the 14th ult., at the Council Chamber, to a large and appreciative audience. We in no wise detract from the merit of Mr. Morris' utterances when we say that he reiterated a thrice told tale. His text has for years supplied the theme on which, in these pages, we have harped both in and out of season; and not harped in vain.

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"Mr. Morris' visit was most timely; he came amongst us to tell us of the value of things just at the time when our reason, sharpened by experience, was ripe for receptivity; and so we feel sure his words fell on no barren soil. We have harped for many a year on the 'Minor Industry' string. Mr. Morris has now touched it with a master's hand, and given to it the true pitch and intensity of tone which it lacked, and which will henceforth cause it to give forth no uncertain sound, but a clear, metallic ring, inviting the workers of our busy hive to spend their energy wherever honey may be gathered or stored.

"We have no intention of dealing categorically with Mr. Morris' lecture; its main lesson is too valuable and too obvious, and we would not like to utter a single word that might, perchance, deflect the mind of the producer from the consideration of that lesson: and that lesson is this, 'in these days nothing is too small, nothing too insignificant, that it can be despised.' Bananas have made Jamaica prosperous, yielding an export to the value of over half-a-million sterling; and from this at one time small and apparently insignificant industry—but now worth a half-million—as a natural consequence, roads and railways, shipping and telegraphic communication, have sprung into existence as it were by magic, culminating in a noble exhibition."

This lecture at Barbados brought my visit to the West Indies to a close. I embarked on board the "Medway" in the afternoon for England. I arrived at Plymouth on the 25th February, and reached Kew on the following day. My mission had in all occupied 106 days. The distance travelled during this period was a little over 12,000 miles.

SUMMARY.

The chief object of my mission to the West Indies was to give such assistance as might be required by the several Governments in laying out and organising the Botanical Stations established, or about to be established, in the Leeward and Windward Islands. It was a necessary part of my duty in this respect to settle by conference the practical details connected with the working of the Stations from any centre that might be decided upon as most advantageous to them, and to solve the innumerable petty administrative difficulties which had hitherto hindered the effective working of the scheme and given rise to considerable correspondence. While doing this, I had been requested by the Secretary of State to afford as much assistance as possible in regard to the development of local industries and to render generally my visit to the several islands as effective and as useful as the time at my disposal would allow. It will be gathered from my report that I visited first of all the Leeward Islands, and devoted three weeks in carefully planning and organising the Botanical Stations in the islands of Antigua, Dominica, Montserrat, and St. Kitts-Nevis. A detailed report was furnished to the Governor in respect of each Station, and much time was spent with the Curators in discussing and determining the various operations desirable to be undertaken to render the Stations efficient agents in carrying out the special objects for which they were created. In addition the island of Anguilla, in the Presidency of St. Kitts-Nevis, and the island of Tortola in the Virgin Group were visited for the purpose of advising in regard to industries best suited to their requirements. Public addresses were delivered at Antigua, Dominica, Montserrat, and St. Kitts.

I then proceeded to the Windward Islands for three weeks more, and an exactly similar course was pursued in regard to the Botanical Stations at St. Lucia, St. Vincent, and Grenada. Addresses were also delivered in each of these islands, and much time was spent in affording information to the Governments and to those private people who sought it, based on a careful study of their special circumstances. Although Barbados was not included in the scope of my mission as first planned, I was happy to accede to an invitation extended to me while in the West Indies to visit and report upon the Botanical Station at Dodd. I further gave an address in the Council Chamber at Bridgetown on cultural industries. My visit to Jamaica gave me an excellent opportunity of witnessing the great progress made in that island of recent years, and I was able to discuss with the Assistant-Colonial Secretary and with Mr. Fawcett the details of any connexion that might be considered necessary to establish between the Botanical Department of Jamaica and the stations in the Leeward Islands as defined in Sir Henry Norman's letter of the 9th May 1887. At the wish of Sir William F. Haynes Smith I was successful in arranging with private persons in Jamaica to supply from time to time consignments of good seed of Blue Mountain coffee and of other economics procurable in commercial quantities for the Leeward Islands. I was also able to procure for them what they had hitherto failed to receive, viz., a valuable consignment of the suckers of the Jamaica banana required for the American market. I gave the opening lecture in connexion with Jamaica Exhibition on February 9th.

It only remains now for me to refer to the general conclusions arrived at in regard to the supervision of the Botanical Stations.

It has been felt all along that the smaller islands under present circumstances could not support any considerable organisation of their

own, but on the other hand if they joined together and affiliated their Stations to one or other of the larger Botanical Institutions at Jamaica or Trinidad, there were good grounds for believing that satisfactory results would be attained. The Stations in the Windward Islands at Grenada and St. Vincent have already been placed under the supervision of Mr. J. H. Hart, F.L.S., the superintendent of the Botanical Gardens at Trinidad, and the arrangement has been in force for a sufficient time to justify its continuance. The Curators, some of them new to tropical conditions, are thus brought into contact from time to time with an experienced and capable head, and they are able to correspond regularly with him in regard to practical details, and to obtain, by exchange, regular supplies of seeds and plants specially required for their gardens. If no other arrangement be eventually practicable, I would suggest that the St. Lucia Station be also placed under Mr. Hart's supervision.

As regards the supervision of the Stations in the Leeward Islands the matter is not so easily of solution. They are to some extent beyond the reach of both the Trinidad and Jamaica Gardens. I am glad, however, to find that the Governments of both these islands are prepared, under certain conditions to lend the services of their officers for the supervision of the Stations in the Leeward Islands. The cost to the islands themselves would be somewhat less than if they had a superintendent of their own, but on the other hand, the rapid development which is taking place in the Leeward Islands and the opportunity which may probably offer itself for combining the office of superintendent with that of Secretary of the newly organised Agricultural Society lead me to the conclusion that if a salary could be provided for the combined offices likely to attract a suitable man, it would be in every way preferable to have the entire services of such a man for agricultural affairs in the islands rather than the occasional visits of an officer from Jamaica or Trinidad. The reasons which appear to justify such a course have already been brought at some length under the notice of the Secretary of State and I need not dwell any further upon them.

The Botanical Station at Barbados has been affiliated to the Jamaica Botanical Department for several years. It pays 20*l.* a year towards the expenses of correspondence and the special privileges it enjoys, and receives in return 100 copies monthly of the *Bulletin* of the Jamaica Department, and regular consignments of seeds and plants at reduced rates. The plants, up to a certain limit, are carried between the two islands by the Royal Mail steamers free of charge. The arrangements, so far, have proved thoroughly satisfactory on both sides, and there is every desire to maintain them.

There are good grounds for believing that the Botanical Station scheme devised for meeting the special requirements of the Leeward and Windward Islands will now be finally set in motion. The Stations are all in a fair way of being established, the Curators are active and intelligent, and the people are most anxious to utilise them as much as possible. It is very clearly understood that the Curators cannot devote much attention to plants of a purely decorative character, and that they are not expected to maintain large areas under cultivation as pleasure grounds. Their special work is to encourage and assist in the development of cultural industries, and the closer they keep to this initial idea the better will they attain the objects set before them.

It has always been considered desirable to associate with the distribution of plants from the Botanical Stations the preparation and distribution of short and practical hints respecting their treatment and cultivation. By means of such hints which might take the form of

botanical bulletins on the model of that issued from the Royal Gardens, Kew, the people would be instructed in the conditions and circumstances under which economic plants might be best utilised as objects of remunerative industry. The *Kew Bulletin* was first issued on the 1st January 1887. A *Bulletin* of the Botanical Department, Jamaica, was started in April 1887, and a similar *Bulletin* of the Royal Botanical Gardens, Trinidad, was also started in April 1887. Since that time botanical bulletins have been prepared in connexion with the Botanical Stations at Grenada and St. Vincent, and others are in course of preparation. In many islands the Official Gazette is used for the publication of progress reports and also of extracts from the *Kew Bulletin* bearing on botanical subjects of local interest. This plan is of great utility, especially where no newspapers exist, and it might very well be extended to every island, until it is found practicable to issue a regular bulletin.

As regards correspondence, the Curators of the Botanical Stations should keep in regular touch with the supervising officer, and discuss with him all matters relating to the routine work of the Stations, as well as questions affecting the determination of species, and the supplies of seeds and plants. It is most important that all such matters should be well discussed and elaborated locally before they are officially referred to Kew.

The regulations suitable for the protection and government of Botanical Stations have been fully discussed with the local authorities. Those drawn up for the Botanical Station at St. Lucia (given in Appendix B.) might very well be accepted, with certain obvious modifications for other Stations. At first the Curators will have little time for making botanical collections of dried plants. It would be well, however, for them to study the local flora and make themselves thoroughly acquainted with the indigenous plants possessing interest or of economic value. They should collect and establish such plants in a living state in their gardens and utilise them for the purpose of making exchanges with kindred institutions in the West Indies and elsewhere, and so enlarge their collections without incurring much expense in the purchase of seeds or plants.

The training of young men as gardeners and the dissemination of practical information in regard to the propagation and cultivation of economic plants are most important functions of the Botanical Stations.

I have already dwelt at considerable length on this subject in my public addresses, and I look forward to the Botanical Stations proving most beneficial as schools of practical horticulture in the smaller islands.

In closing my report I desire to express my deep appreciation of the great kindness and courtesy I received everywhere in the West Indies. I was welcomed by all classes of the community from the Governors downwards with such genuine goodwill and such hospitality that my visit, in spite of the necessarily continuous and rapid travelling which it entailed upon me, has left most pleasant recollections upon my mind. To his Excellency Sir William F. Haynes Smith, K.C.M.G., Governor of the Leeward Islands, and to his Excellency the Honourable Sir Walter Hely-Hutchinson, K.C.M.G., Governor-in-Chief of the Windward Islands, with whom I spent several weeks in close relation, to further the objects of my mission, my warmest thanks are especially due.

D. MORRIS.

Kew, April 20, 1891.

APPENDIX A.

The following Rules drawn up for the protection and government of the Botanical Station, St. Lucia, may be usefully placed on record for the guidance of other Stations :—

RULES FOR THE PROTECTION AND GOVERNMENT OF THE ST. LUCIA BOTANICAL STATION.

1. The Governor may from time to time appoint some person who shall have the general supervision and control of the Station.

2.—(1.) The Governor may from time to time appoint any number of persons to be a committee to advise on matters connected with the working of the Station.

(2.) The supervising officer shall be chairman of such committee.

3. The committee shall meet for business at least once a month in the gardens, and at such other times and places as may be appointed by the chairman.

4. The members of the committee shall at all times have free access to the gardens, and may make any inquiries they desire of the Curator touching the working of the Station.

5. The members of the committee shall note in a book to be kept for the purpose, and to be called the Suggestion book, any circumstances connected with the Station which it may be desirable to bring to the notice of the committee.

6. All communications and directions from the committee to the Curator shall be made through the Chairman of the committee.

The Curator.

7.—(1.) The Curator shall, as far as possible, place himself in a position to afford information respecting the cultivation, use, and economic value of plants, and of all other matters which come within the purposes of a Botanical Station.

(2.) If he is unable to afford information in any such matter at the time it is sought, he shall make a note thereof and endeavour to obtain and supply it as soon as possible after.

8. He shall forward to the supervising officer of the Station, within the first week of every month, a memorandum, suitable for publication, giving information as to the work performed in the gardens during the preceding month, as to any new plants or seeds received, as to any matters of interest connected with the station or the agriculture of the colony generally, and drawing attention to any subject of interest in any botanical or other publication.

9. He shall forward to the Governor during the month of January in each year, an Annual Progress Report, extending the information in his monthly memoranda to the whole year. To this report appendices shall be attached, giving—

(1.) A list of books and publications belonging to the Station.

(2.) A list of tools and instruments belonging to the Station.

(3.) A list of plants ready for distribution.

10. He shall be responsible for the up-keep of the Station to the best advantage with the funds placed at his disposal.

11. He shall not incur expenditure without the authority of the Governor.

12. He shall, except when his presence is needed elsewhere in the interest of the Station, be in attendance at the gardens during working hours on every day of the week except Sundays and Public Holidays.

13.—(1.) He shall keep such books as the Governor may from time to time direct.

(2.) A list of such books shall be kept in a conspicuous place in his office.

14. He shall have the control over all labourers and persons employed in the gardens, and shall regulate their work and wages to the best interests of the Station.

15. He shall strictly enforce all rules with regard to visitors.

Visitors.

16. The gardens shall be open for the admission of visitors on every day of the week between 6 a.m. and nightfall.

17. Visitors shall not stand or walk on any garden beds or other parts of the gardens to which free access may not be allowed.

18. Visitors shall not pick or break any plants or flowers in the gardens.

19. No person shall be allowed to carry any load into the gardens.

20. No carriages or vehicles of any description, and no horses or other animals shall be admitted within the gardens.

21. No person shall sell or expose for sale any articles within the gardens.

22. No public meetings, picnics, or gatherings of a similar character shall be allowed within the gardens.

23. No person shall be admitted within the gardens unless decently dressed.

24. Any person who conducts himself in a disorderly manner in the gardens, or contravenes any of the rules for the government of the Station, may be summarily ejected by the Curator, and may also be proceeded against for the contravention of the rules or the disorderly conduct.

Sale and Distribution of Plants.

25.—(1.) Sales of plants, flowers, and fruit shall be according to a scale approved by the Governor.

(2.) Such scale shall be published for general information, and copies shall be placed in conspicuous parts of the gardens.

26. All payments shall be made to the Curator, who shall give a receipt therefor from a counterfoil receipt book.

27. All sums received by the Curator shall be paid into the Treasury weekly, and oftener if at any time the cash in his hands exceeds the sum of five pounds.

28. No plants, flowers, or fruit shall be issued by the Curator, without the authority of the Governor, except on payment of the fees prescribed.

Miscellaneous.

29. A library shall be formed in connection with the gardens, in which the Curator shall place all botanical pamphlets, reports, periodicals, or bulletins, which may be sent him.

Passed the Executive Council, this 12th day of January 1891.

J. B. CROPPER,
Clerk of Councils.

APPENDIX B.

The following correspondence relates to the exhibits forwarded from the Windward Islands to the Jamaica Exhibition, 1891.

The GOVERNOR-IN-CHIEF OF THE WINDWARD ISLANDS to
Mr. D. MORRIS.

Government House, Grenada,

January 14, 1891.

SIR,

As I am unable to visit the Jamaica Exhibition, I should feel much obliged if you would favour me with a report on the Windward Islands Exhibits. I am anxious to hear, from an independent source, what measure of success has attended the attempts which have been made in the Windward Islands to secure proper representation at the Jamaica Exhibition.

I have, &c.

(Signed) WALTER HELY-HUTCHINSON.

D. Morris, Esq., M.A., F.L.S.

Mr. D. MORRIS to the GOVERNOR-IN-CHIEF OF THE
WINDWARD ISLANDS.

SIR,

Royal Gardens, Kew, March 2, 1891.

I BEG to acknowledge the receipt of your Excellency's letter of the 14th January, in which you desire to learn "from an independent source what measure of success has attended the attempts which have been made in the Windward Islands to secure proper representation at the Jamaica Exhibition."

2. I had the pleasure of being present at the opening of the Jamaica Exhibition by H.R.H. Prince George of Wales on the 27th January, and I was able during the following fortnight to spend considerable time at the Exhibition, and carefully examine the various articles on view there.

3. In the first place I would mention that the Exhibition building is one of the most attractive ever built for an International Exhibition. It is strikingly situated at the head of the Racecourse facing Kingston and the sea; and it has a magnificent panorama of hills at its back culminating in the Blue Mountains rising to elevations of 6,000 to 7,500 feet. The grounds adjoining the Exhibition are tastefully laid out. Numerous palms, bamboos, and tropical trees and shrubs have been successfully transplanted and established there by the Botanical Department of the Colony; while dotted about are industrial villages and models of sugar, coffee, cacao, and other "works" and appliances illustrating the methods adopted for curing and preparing tropical products.

4. The arrangements in the interior of the main building have been carefully planned and intelligently and tastefully carried out. The West Indian Colonies represented (consisting of Barbados, the Windward Islands, and the Bahamas) occupy prominent positions in the building and are grouped as nearly as possible around the central dome. All the

Colonies mentioned have been successful in adding greatly to the interest of the Exhibition; and they deserve to be highly commended for the enterprise shown by them in supporting what is undoubtedly the most successful Exhibition, so far, held in any portion of the West Indies.

5. The exhibits of the Windward Islands occupy positions on the northern side of the central dome. The St. Vincent court is to the right, and the St. Lucia and Grenada courts are to the left of the main aisle leading from the dome to the north door. These courts have been planned and arranged by Mr. P. C. Cork, the Honorary Commissioner, and Mr. T. B. C. Musgrave, Superintendent for St. Vincent. The results of the labours of these gentlemen are apparent in the very tasteful and successful way in which the various articles are displayed, and the facility with which they can be examined by those specially interested in them.

6. I may say at once that both in the number of articles displayed and in the manner in which they have been prepared the exhibits in the St. Vincent Court are of exceptional merit. A simple enumeration of them covers seven pages in the official catalogue. This last statement, however, gives but a very poor idea of the real nature and character of the exhibits. They consist of nearly everything relating to the mineral and vegetable productions of St. Vincent, and suggest in a striking manner the numberless resources of the island capable of being developed under suitable circumstances.

7. The principal articles consist of sugar, rum, arrowroot, starches, tapioca, cacao, coffee, numerous fibres, tanning materials, ginger, nutmegs, cinnamon, mace, black pepper, turmeric, tobacco, cigars, carib baskets and wicker work, medicinal plants, honey and bees' wax, fruits in syrup and crystallised, jams, jellies, walking sticks, native timbers, native cordage, fishing lines, carib stone hatchets, vegetable oils, building stone and lime, antimony, native hats, native made leather, spa mineral waters, and an inlaid table (containing over 5,000 pieces of 30 native woods.) Of purely botanical collections Mr. George W. Smith has contributed a named set, numbering about 200 species, of St. Vincent ferns; Mr. D. A. MacDonald a set of St. Vincent mosses and ferns; and Miss Maling a set of St. Vincent grasses. The Government of St. Vincent exhibits a collection of native plants, prepared by Mr. Geo. Smith, possessing medicinal and commercial value. To each plant a few notes are added explanatory of the use for which it is adapted.

8. Possibly the most striking and suggestive of the raw products of St. Vincent are its excellent fibres and fibrous materials. There are several very complete sets of these. One set, prepared by Mr. Powell, Curator of the Botanical Station, exhibits the fibres in a remarkably fine condition. Such fibres as "lapite" prepared from a wild variety of the common pine-apple; "gri-gri" skilfully prepared from the young leaves of a palm; and "china" prepared from the petiole of a species of *Anthurium*, are good examples of what St. Vincent is capable of producing, while the fibre of a form of *Agave rigida* to which attention has lately been directed at St. Vincent is excellent in quality, but apparently too short to compete successfully with the best sorts of Sisal hemp, as produced in the Bahamas and elsewhere. The woods of St. Vincent are well shown by Mr. E. M. Beach (53 samples), Mr. J. G. Nanton (6 samples), and Mr. H. Powell (52 samples). There are several exhibits of turnery work, illustrating the character of the St. Vincent woods. Few West Indian Colonies can produce better woods.

9. The articles of Carib manufacture are a special production of St. Vincent. It is one of the few places, if not indeed the only place, in the

Lesser Antilles, with the exception of Dominica, where there are still to be found some of the aboriginal inhabitants. The Carib baskets, fibres, cordage, fishing lines, and other articles exhibited in the St. Vincent court possess great interest. This interest is increased by the fact that the Government of St. Vincent has despatched six Caribs to the Jamaica Exhibition to carry on the work of basket-making in one of the industrial villages. Altogether I regard the efforts made by the St. Vincent Government to secure a proper representation at the Jamaica Exhibition as exceptionally successful.

10. I come now to the Grenada and St. Lucia courts. In point of size and the number of exhibits neither of these attain to the standard of the St. Vincent court. The islands themselves are quite as fertile and their productions are probably equally interesting, but as regards their representation at the Jamaica Exhibition they have not been equally successful. The Grenada exhibits consist of a fine series of cured cocoa, the staple industry of the island. There are several fine samples of sugars and rums; of spices such as nutmegs, mace, ginger, cardamoms, cloves, and cinnamon; of Arabian and Liberian coffee; of native woods, fibres, starches, preserves, jellies and sauces, tobacco, native grown rice, of cotton from Carriacou and Cannouan, some of the few places where cotton is still cultivated in the West Indies. In the industrial village was shown a model of Mr. Messervy's hot water apparatus for curing cacao. This apparatus is capable of being adapted at a small cost to the ordinary "boucan" found on Grenada estates. The heat is applied by a simple low-pressure boiler.

11. The St. Lucia exhibits consist of vacuum-pan crystallized and muscovado sugars, rum, cotton, fibres, syrups, tobacco, limejuice, pickles, starches, native woods, grain d'ambrette (*Hibiscus Abelmoschus*) or vegetable musk, and plants said to possess medicinal properties. Amongst these latter are some leaves of a species of *Clusia* said to be useful in cases of enlarged spleen. Mr. Garraway furnishes the following particulars:—"The Aralie leaves (*Clusia rosea*) are used by Creoles "as a remedy for enlarged spleen. In the green state, the full grown "leaves are thick and leathery. Before applying them, they are "softened over a lamp, and smeared with candle grease. They are "then laid on the swollen side, four or five in ordinary cases, so as to "overlap one another. Fresh leaves are applied night and morning, "and this is continued for eight or ten days. The remedy is worth "trying where coolies, so subject to enlarged spleen, are employed. "The leaves being fixed in place by a broad belt round the waist, the "patient can go about his ordinary duties, take no medicines, and eat "and drink as usual."

12. The clay pipes and flower pots from St. Lucia show that excellent pottery material is found in the island. In fact, it is evident from all the articles sent from St. Lucia, although in this instance very few, and not specially worked up, that the island is practically undeveloped as regards its natural wealth, both vegetable and mineral.

13. Before closing this brief, and necessarily very incomplete account of the exhibits from the Windward Islands at the Jamaica Exhibition, I would desire to express the pleasure I felt in seeing these islands so fully in sympathy with the present development in West Indian industries. Jamaica has taken wonderful strides during the last few years in such industries, and the prosperity which has resulted to Jamaica on this account will, I hope, before long, extend also to the other islands in the West Indies. As Governor-in-Chief of the Windward Islands it must afford your Excellency great pleasure to see that

the people in these islands are awaking to the possibilities within their reach, and making such energetic and most successful efforts to develop their resources.

I have, &c.
His Excellency (Signed) D. MORRIS.
The Hon. Sir Walter Hely-Hutchinson, K.C.M.G.

THE GOVERNOR-IN-CHIEF OF THE WINDWARD ISLANDS to Mr. D. MORRIS.

SIR, Grenada, March 19, 1891.

I HAVE the honour to acknowledge, with thanks, the receipt of your interesting and valuable report on the exhibits of the Windward Islands at the Jamaica Exhibition.

I am forwarding a copy to the Secretary of State for the Colonies, and copies to the Administrators of St. Vincent and St. Lucia, and to the Governor of Jamaica.

I have, &c.
(Signed) WALTER HELY-HUTCHINSON.
D. Morris, Esq., M.A., F.L.S.